# GAS JOURNAL

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## Editorial Notes

### Sheffield

"THE district of Sheffield is unique in that it has the only gas grid in the country, and the grid is proving a great benefactor not only from the industrial point of view, but also from that of public health."

In these terms H.R.H. The Duke of Kent paid tribute last week to the pioneer work which has been, and is being, carried out by the Sheffield Gas Company with all the drive and enthusiasm which Mr. Ralph Halkett devotes to any task which comes to his hands. The Royal Family have always been generous in their recognition of that great public utility service, the Gas Industry, but even so Royal visits are events which do not occur every day. It is fitting, therefore, that this latest bestowal of a coveted honour should have been reserved for one of the most startling developments of recent times in our Industry. Whatever individual views may be held on the leading question of taking supplies of gas from coke-ovens, there can be nothing but admiration for the energy with which the Sheffield Company has pursued the policy to which it has pinned its faith. Even for a district which is exceptionally favourable as regards supplies and markets results have been little short of astonishing. The Company is, in fact, collecting, and so to speak co-ordinating, vast supplies of gas which formerly went to waste, and is making them available in usable form to industries for which gas, at the right price, is the ideal fuel. Many of the speakers at the function last week, in addition to the Duke of Kent, found opportunity of referring to the national importance of the work which the Sheffield Gas Company is doing, especially at a time when much, though by no means all, of the steel industry's energy is devoted to the urgent work of re-armament—precision work which demands a precision fuel.

For the Gas Industry, with its growing appreciation in recent years of the potentialities of the industrial load, the enormous business done in Sheffield is a first-rate advertisement, but in thinking even of Sheffield in connexion with gas the domestic side must not be forgotten, and an article in later pages of this issue clearly shows the progress made in all directions.

Wednesday of last week was a proud day also for Messrs. Newton Chambers & Co., Ltd., makers of the spiral-guided holder which was the centrepiece of the day's celebrations. The largest of its type in the world, its completion in the schedule time of 14 months in the face of many difficulties raised by Nature was an achievement worthy of a firm which can proudly claim the knowledge and experience of 144 years. It was an interesting point made by their Chairman that their subsidiary coking company supply to the Gas Company every day nearly enough gas to fill the huge new holder. During erection one of the severest winters of modern times was experienced, and often work had to be carried on through heavy snowstorms; inflation tests were accompanied by severe gales.

Owing to a gale, too, the Duke of Kent was unable to fly to Sheffield from the South for the inaugural ceremony, and the result of his having to make the journey by train was that the whole programme was put back, and last-minute condensation and adjustment had to be made. We mention this point only for the purpose of emphasizing the admirable arrangements which the Gas Company made for the Royal visit and for the comfort of its many guests. The sudden alterations must have caused a good deal of rapid thinking, but the smoothness with which everything ran is a great tribute to the organization, which was in the hands of Mr. Ralph Halkett, Jun. He and all others concerned are to be heartily congratulated for their part in what was a great day for the Gas Industry.

### Fuel Policy

IN the "JOURNAL" last week we published the Paper which Sir David Milne-Watson gave at the International Engineering Congress in Glasgow, and in a brief comment on it we expressed the hope that it would have a "hearing" far beyond the confines of the session of the Congress at which it was delivered. From the national aspect the Paper was one of import. Not for the first time Sir David in effect asked the thinking man to consider how best to utilize the basic wealth of Britain, which is coal. Is it economically desirable to burn it in the raw state? Is it preferable to transform its heat content wholly into electrical energy or wholly into gaseous energy? Is it possible to evolve a rational fuel policy? We pride ourselves on our scientific achievements, yet in 1938 no less than 53% of our heat requirements is met by the burning of bituminous coal. It is estimated—and this estimate has been subject to such scrutiny that it cannot be far wrong—that the use of raw coal in the domestic grate causes damage to the extent of over £1 per head of the population per annum. Is this a sign of British prudence?

There are three alternatives to the destructive policy of burning coal in its raw state. These alternatives are smokeless solid fuel, gas, and electricity. Economic considerations

apart, both gas and electricity hold obvious, and on balance more or less equal, advantages. Both are unobtrusive; their use involves a minimum of effort. Gas is more reliable simply because it can be stored, but the reliability of electricity supply monthly becomes more assured.

The British public must, however, think about its pocket. That is why we have placed the three alternatives to raw coal, filth, and smoke in the order of smokeless solid fuel, gas, and electricity. Economically to supplant raw coal by gas to-day would be impossible, however great the genius of tariff promoters. For the domestic hearth a gaseous B.Th.U. is more expensive than a coal B.Th.U.; an electrical B.Th.U. is very much more so. It may be that people will be willing to pay for the more convenient gaseous B.Th.U.; it may be that a section of the people will be happy to pay for an expensive electrical B.Th.U. At the moment—and this must be faced—the wages of the majority of British people are insufficient to support either an all-gas era or an all-electric era.

It seems to us an elementary proposition that it is economically impossible to sell a product for any length of time lower than the cost of production. No tariff expert will convince us that it is good business to spot the limelight on the selling side of the Gas Industry and to draw a veil over the retort house. At the same time, no engineer, however ardent or meticulous, will destroy our belief that promotional tariffs for gas are essential.

The brass tacks of to-day are the chromium-plated ones of to-morrow—or so we like to think. By hydrogenation under pressure the coal substance can be converted into gas—again, at the moment, at a price. For twenty years and more it has been suggested that a modern blue water gas set does everything that a combination oxygen plant and oxygen producer accomplishes, and does so with approximately similar efficiency and considerably less investment—which is no reason why research should not be made into the possibilities of gasifying coal in oxygen in a continuous system. While this research is in progress, there is at hand immediately a proved and economic method of obviating the damage to health and property caused by the burning of raw coal. The remedy lies in the combined use of gas and coke, which, in the words of Sir David, can provide a fuel system "really worthy of the twentieth century and within the family budget." Kensal House, to which we have referred many times in these columns, is an outstanding example of what the Gas Industry can do to provide warmth, comfort, and convenience at a cost within the means of the working-class. The Industry offers gas, covering at one step the difference between smoky solid fuel and clean, automatically controlled heat, and it has a half-way house of the greatest value—a smokeless solid fuel. On the score of cost the use of raw coal cannot be defended. Yet, as Sir David remarked, when recently a sample of British post-war housing had to be taken for an international comparison of European housing, seven estates were chosen, and all seven relied on the burning of raw coal. Which shows that the Industry must make more widely known the fact that it can provide a service giving an enormous increase in convenience and efficiency, including smokelessness, and within present-day costs.

"The future of the Gas Industry in domestic supply," said Sir David, "lies in the rationalization of fuel service for heat by the concentration of the main cooking, space heating, and water heating loads under one set of distribution costs. For some years to come a smokeless solid fuel will necessarily split the space heating loads; that fuel the Gas Industry possesses in coke." There is no doubt that the immediate future development of the Industry—which has a natural aptitude for domestic heating not shared by any other industry—must aim at striking an economic balance between gas and coke production. Sir David did not enter into any detail regarding the sphere of electricity in the home. He analyzed this matter very clearly in the Address he gave last autumn at the conference of the British Commercial Gas Association; and it is apparent that a widely extended use of electricity for heating in the home would mean the improper use of the nation's fuel resources and would also mean dearer electricity. It is safe to assume that any wholesale development of domestic heating by electricity is unlikely. The cost would be prohibitive.

# Ammonia and Tar

On a later page we publish an extract from the Chief Inspector's Report for 1937 on Alkali, &c., Works, from which it will be seen that during the year the production of concentrated ammoniacal liquor rose very considerably. Allowing for the incursion of synthetic ammonia, the production of ammonia compounds demonstrates the fact that the great decrease in the number of works in production is due to centralization rather than to wastage of liquor. In spite of the advance in the selling price of sulphate of ammonia which took effect in July of last year, its manufacture is economic only where it is carried out on a large scale. With the aid of modern plant, however, gas liquor can be economically concentrated and disposed of to central works where it can be converted into salts; and in this connexion the Chief Alkali Inspector for England and Wales, Mr. W. A. Damon, mentions the final report of the Effluents and Ammonia Committee of The Institution of Gas Engineers presented at the research meeting last November, indicating the advantages of partial decarbonation of crude gas liquor before concentration in enabling a strong product to be made without danger of crystallization. In his report for Scotland, Dr. Birkett Wylam records an increase in gas-works production of ammonia products by about 18% compared with 1936, and that year showed a substantial increase over 1935.

The distillation of tar, too, has increased, several new tar distillation plants having been erected, most of them being of the continuous type and based on "flash" distillation. The greater demand for creosote resulted in a higher pitch production. The pitch market, however, has not been able to absorb the whole of the production, and large quantities of pitch have been accumulated in the various works. This has led a number of manufacturers to employ it for steam raising; and it is now perfectly possible and relatively easy to burn pitch without undue smoke emission. It will be recalled that in the last report of the Fuel Research Board mention was made of the use of the "Multijet" burner developed at East Greenwich for the burning of hard pitch; and while it is good to know that a satisfactory technique has been established it would be better if more useful and remunerative markets could be found.

As in former years the Alkali Report devotes considerable space to the problem of industrial smoke—a nuisance, but one not nearly so harmful as domestic smoke. We have kept our readers informed of what progress has been made towards the establishment of Regional Committees to secure a reduction of atmospheric pollution by smoke; and Mr. Damon

shares our regret that more has not been done in this direction. "Although," he observes, "a certain reluctance to delegate any of their powers can be readily understood, local authorities which are considering joining Regional Committees should give due weight to the advantages of organization and co-operation which are enjoyed by such Committees, particularly if they are supported by a trained staff of smoke inspectors. Where a Committee is formed with executive powers by the delegation of functions on the part of constituent authorities there is undoubtedly a great access of strength." The latest move in this direction was referred to in the "JOURNAL" for March 2 last, when we recorded that at a conference of local authorities in Greater London a resolution was carried that steps should be taken to promote the formation of a Regional Committee for London and Greater London—a move indicative of the growing public concern with the smoke nuisance and of the realization that the problem can be tackled in a practical way. As we said at the time, it is obviously more practicable for the Ministry of Health to deal with a committee representing a consolidated region than with a number of individual authorities which may hold conflicting views.

In previous reports Mr. Damon has had occasion to complain of the escape of "green" gas during the charging of coke ovens; and in his report last year he expressed disappointment that more active steps had not been taken by coke oven owners to reduce the quantity of gas and smoke which escapes from the ports of the ovens when charging is in progress. Consideration of the problem has led to the conclusion that the mere provision of steam ejectors, for creating extra draught, is insufficient. The mains and exhausters, states the present report, must be of ample capacity and an efficient and sensitive governing system is also essential. The gas collecting main should be on the coke side of the battery instead of the ram side; such an arrangement minimizes the loss of draught occasioned by an open leveller door. Greater attention should be paid, it is suggested, to the design of coal charging hoppers to ensure free and expeditious discharge of the coal to the ovens. Again, "it is not only from the charging ports that emission of smoke occurs. At many batteries the oven doors leak badly and observation suggests that the modern 'self-sealing' doors are by no means the least offenders." That there is no need for an undue escape of smoke in coke oven operation is exemplified among other plants by the installation at the Beckton Works of the Gas Light and Coke Company. As a matter of fact, in a previous report Mr. Damon cited this installation. Reference is also made in the report to the emission of sulphuretted hydrogen from the water used for the shock cooling of coke oven gas; and in the opinion of the Alkali Inspectors there seems no adequate reason for the continuance of a practice which is a potential source of local nuisance.

## Co-Partnership in the Gas Industry

The June issue of *Co-Partnership* contains some interesting figures relative to co-partnership and profit-sharing schemes in the Gas Industry. Of the 59 Companies mentioned, the South Metropolitan Gas Company is, of course, the senior, its scheme having been in operation for 48 years. As regards the amount of shares and deposits held by employees, the Gas Light and Coke Company heads the list at £1,603,747 out of its total share and loan capital of £44,324,733. In the South Metropolitan Company £990,009 is held by employees out of a total capital of £11,591,152. Among the provincial undertakings the largest employee holding is £209,255 out of £4,282,829 at Liverpool, whose scheme has been in operation for 27 years; this represents a total of nearly 2,500 employees who are financially interested in the Liverpool Company. Among the provincial companies Sheffield has distributed the largest total profit to employees since the scheme was inaugurated 15 years ago, its figure of £270,422 being exceeded by five metropolitan companies only. As regards the number of employees under agreement for profit sharing or co-partnership, the aggregate of 52,779 is made up of totals ranging from 19,192 in the Gas Light and Coke Company to 5 at Newmarket, while the total sum held by employees in the 59 undertakings is £4,404,228. Reference is made in the same issue of *Co-Partnership* to the Liverpool Gas Company's scheme and to the valuable Conference held in April by invitation of the Chairman and Directors of the Gloucester Gas Light Company.

## Making Easy Payments Easier

A great deal has been heard, both inside Parliament and out, as to the working of the hire-purchase system, though there can be little doubt that, under reasonable conditions, it operates smoothly. In the Gas Industry it is operated fairly, and reports and accounts demonstrate its ever-growing popularity among consumers. But even here it may occasionally happen that instalments are not duly provided for. The City of Leeds Gas Committee have considerately set themselves to provide against such an eventuality, and we commend what they have done to the notice of others. In their recently issued annual report to the Council they state that an arrangement was introduced in June, 1936, by means of which consumers are provided with a small attractive box in which to save the money necessary to meet charges for hire-purchase rentals on appliances, and, if desired, the cost of gas consumed can also be provided for in this way. The response, we are told, has been very satisfactory. At the end of March last 11,225 boxes were in use, and 2,872 of them were being used for payment for gas also. By this means the Department obtain payment at each visit of the inspector, instead of quarterly accounts being rendered, and they are saved the cost of providing and fixing a prepayment meter in each case. One presumes the consumer would be careful to keep the box in safe custody.

## "GAS JOURNAL" Directory

In order that readers may be able to keep the particulars contained in the "JOURNAL" Directory up to date, we summarize below changes which have occurred during the past month:

Page 14. CALDICOT. A. E. Pask, E., M., & S., resigned.
„ 30. HAWORTH. Undertaking taken over by Keighley Corporation.
„ 32. HECKINGTON. G. E. Shearman appointed E. & M.
„ 40. LITTLEBOROUGH. D. J. Colvin appointed E. & M.
„ 46. MONMOUTH. A. E. Pask appointed E., M., & S., vice H. Matterface, retired.
„ 48. NEWCASTLE-UPON-TYNE. R. Gray, C.E., deceased.
„ 50. OSWALDTWISTLE. D. J. Colvin, E., M., & S., resigned.
„ 58. RUSHDEN. A. T. Watson, E. & M., deceased.
„ 80. BUCKIE. H. Keillor appointed E. & M.
„ 90. PENICUIK. A. Sneddon appointed E. & M.

## Forthcoming Engagements

**July.**

**11.—I.G.E.**—Finance Committee, 1.45 p.m.; Membership Committee, 2.15 p.m.; General Purposes Committee, 3 p.m.; Benevolent Fund Committee of Management, 4.30 p.m.

**12.—I.G.E.**—Council, 10 a.m.

**12.—N.G.C.**—Central Executive Board, 2.30 p.m.

**19.—I.G.E.**—Gas Education Executive Committee, 11 a.m.; Gas Education Committee, 2.30 p.m.

**19.—S.B.G.I.**—Council Meeting, 56, Victoria Street, 2.30 p.m.

**22.—I.G.E.**—Liquor Effluents and Ammonia Committee, 11.15 a.m.; Joint Research Committee, 2.30 p.m. (*Transferred from June* 24.)

**August.**

**9, 10, and 11.—Irish Association of Gas Managers.**—Annual Meeting in Dublin.

# Personal

The Aberdeen Town Council have confirmed the Gas Committee's recommendation to appoint Mr. HAROLD S. MILNE, Chief Assistant to the Engineer and Manager, Worcester New Gas Light Company, to the post of City Gas Engineer, at present held by his father, Mr. S. Milne. Mr. Milne, who is 32 years of age, is a B.Sc. of Aberdeen University. For three years he was engineering assistant with the Woodall-Duckham Company, and during that time was engaged in the erection and operation of vertical retort installations at the gas-works at Aberdeen, where he was in full charge, in Edinburgh, Denmark, and elsewhere. From 1933 to 1937 he was Chief Technical Assistant at the Greenock Gas Department, and in 1937 was appointed Chief Assistant to the Worcester Company.

It is understood that Mr. S. Milne will not be retiring until next March and that his son will act as his Assistant until that date.

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Mr. RALPH HALKETT has been offered and has accepted a seat on the Board of the Worksop Gas Company.

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Mr. H. MATTERFACE, Engineer, Manager, and Secretary of the Monmouth Gas and Water Works Company, retired on June 30. He has held the position for the past 20 years and the Company has progressed materially under his management.

Mr. Matterface has been connected with the Gas Industry all his life. He started his career over 40 years ago at his native town of Bridport with the Bridport Gas Company and was later articled with a gas engineering firm at Frome. He then went to Nuneaton Gas-Works and was subsequently appointed to a position at Kirkcaldy, Scotland. Afterwards, for a period of twelve years, he was Manager of the Cinderford Gas Works, coming to Monmouth some 20 years ago. He is still a Director of the Cinderford Gas Company.

The consumption of gas in Monmouth has been almost trebled under the management of Mr. Matterface. When he came to the town the amount of gas made was in the neighbourhood of 13 million cu.ft. a year, whereas now the amount manufactured is about 35 million cu.ft., although the population of the town has not increased to any extent. The efficiency of the gas-works, which is situated on the same site as the original works, has also been improved by the erection in 1930 of a new vertical retort plant, while in recent years new showrooms have also been opened. In 1935 Mr. Matterface was honoured by being elected President of the Wales and Monmouthshire Association of Gas Engineers, and in the spring of 1936 the Association held their Annual Meeting at Monmouth.

Though his many friends will regret the fact that Mr. Matterface is severing his long connexion with the Monmouth Company, they will all wish him happiness and good health in his well earned retirement.

Mr. Matterface is succeeded at Monmouth by Mr. A. E. PASK, who held a similar position at Caldicot.

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Mr. J. IVAN YATES has been appointed a Managing Director of John Wright & Co., Ltd.

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Mr. J. K. N. DAVIS has been appointed a Managing Director of the Davis Gas Stove Company, Ltd.

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Mr. T. SPENCER, Secretary of the former Seaham Gas and Light Company for twenty-four years, has retired. He held the position until the Sunderland Gas Company took over the Undertaking, and since then has continued to represent the Sunderland Company in the Seaham district.

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Mr. ANDREW SNEDDON, who for the past ten years has been in the service of the Girvan Gas Company, has been appointed Engineer and Manager to the Penicuik and District Gas Company in succession to Mr. John Richmond, whose retirement we have already noted in this column. Mr. Sneddon will take up his duties on Aug. 1.

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To mark the completion of twenty-five years' service, the employees of York Gas Company presented to Mr. H. E. BLOOR, Managing Director, Engineer, and Secretary, an inscribed gold watch on June 30. The presentation, which was made in the Company's new cooker shop in Little Stonegate, was attended by about 200 members of the staff. The watch was handed to Mr. Bloor by the three oldest employees, Mr. C. Watson, Mr. R. Jefferson, and Mr. J. Alderson.

Mr. A. Holliday, Superintendent, who presided, said those who had served under Mr. Bloor since he came to the Company appreciated his many good qualities and, in particular, his kindly understanding. Paying a tribute to Mrs. Bloor, Mr. Holliday spoke of the great help a wife could be to her husband, and Mrs. Bloor, with her tact and skill, had undoubtedly been an inspiration to Mr. Bloor in all that he had achieved. A letter of tribute from Mr. L. Steward, Accountant, who was unable to be present, was read by Mr. Holliday. Tributes were also paid by Mr. J. Richmond, Works Manager, Mr. F. W. Adamson, on behalf of the office staff, Mr. J. Dixon, on behalf of the fitting staff, and Mr. F. Stewart, for the works employees.

Mr. Bloor, replying, spoke of the happiness he had enjoyed while he had been with the Company, and referred to the spirit of good fellowship which existed among the members of the staff. As two indications of the growth of the Company, Mr. Bloor stated that the production of gas during the last 25 years had increased from 579 million cu.ft. to 1,058 million cu.ft. while coal consumption had increased from 40,000 tons to 60,000 tons per year. In 1912 wages amounted to about £20,000; last year more than £50,000 was paid out.

# Obituary

## JOHN BOND

His many friends in the Industry will have learnt with great regret of the death on June 28, at his home in Southport, of Mr. John Bond, O.B.E., who retired four years ago after 30 years as Engineer and Manager of the Southport Corporation Gas Department.

Mr. Bond commenced his career in the Gas Industry at Nottingham in 1886, under Mr. Lewis T. Wright, the then Engineer and Manager, after which he was employed with the Bristol Gas Company, under Mr. Fiddes, and later with the Salford Gas Department, under Mr. S. Y. Shoubridge. He was subsequently appointed Manager of the New Wortley Gas-Works of the Leeds Corporation, which appointment he held until he took up the position of Engineer and Manager at Southport in 1904. He was President of The Institution of Gas Engineers in 1915, and during the war years he served on several Government Committees set up to increase armament production and to procure further fuel supplies for the Navy. It was for these services that the O.B.E. was conferred upon him at the conclusion of hostilities.

In April, 1925, his completion of 21 years' service at Southport was marked by a series of presentations, when just tribute was paid to Mr. Bond's readiness to give a helping hand to the Juniors.

### An Appreciation.

The passing of John Bond leaves the Gas Industry all the poorer, and demands something more than a mere recapitulation of the various positions he so meritoriously filled. He was an exceedingly sound technician, particularly on the chemistry side, and contributed freely of his time and knowledge to the many problems of his day and particularly to research. He was a tremendous "believer" in the Gas Industry, and, in a quiet and dignified manner, upheld its importance and service very effectively. Despite a somewhat retiring disposition he had a charming personality, and his friendship and good fellowship were real and genuine.

Those few friends outside the family circle who were privileged to witness the last rites in the small church at Dean Row, Wilmslow, at a simple and dignified service in a quiet, peaceful, and beautiful churchyard, felt that his life was, in many respects, typified by these surroundings.

It was perhaps, however, in his family circle that one appreciated his full value. For many years his home became the centre for the Christmas gathering of brothers, sisters, and relations, and those who made contact with the "Bond" family on these occasions realized his many excellent qualities and treasure his memory.

F. J. W.

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The death took place at his Gosforth residence on June 29 of Mr. JAMES W. ELLIS, Deputy-Chairman of the Newcastle-upon-Tyne and Gateshead Gas Company. He was in his 83rd year and had been in ill-health only since the beginning of the week.

Mr. Ellis had been a Justice of the Peace for Northumberland since 1912 and had until quite recently sat on the Moot Hall Bench in Newcastle. He was interested in many local enterprises and was Chairman of James W. Ellis & Co., Ltd., iron and steel merchants, of Newcastle and Derwenthaugh. Among other local concerns in which Mr. Ellis was interested were the Newburn Bridge Company; Central Exchange Buildings, of which he was Chairman; Messrs. Clarke Chapman & Co., Ltd.; and the North-Eastern Marine Engineering Company, Ltd., both of which he was a Director. He leaves a widow and three sons. A memorial service was held at Gosforth Parish Church on Saturday morning, followed by private cremation at Newcastle Crematorium.

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The death has occurred of Mr. HARRY GROUNSELL, of Northgate, Louth, aged 68. He was a Director of the Louth Gas Light Company, and a former member of the Town Council.

# News of the Week

**The New Gas-Works at Sidmouth** are the subject of tenders which are being invited by the local Urban District Council, returnable on July 16.

**Of 2,564 Gas Meters Tested** at the Greenbank Testing Station of the Blackburn Corporation last year, the percentage of rejects was only 1·78.

**An Assistant Engineer and Manager** is required at Bath. Particulars of the position, which carries a salary of £750 per annum, will be found elsewhere in this issue.

**The Gas-Works at St. Bees** were on Friday taken over by a new Company, of which Mr. J. Reed, partner in the Whitehaven firm of Messrs. William Reed & Sons, is Secretary. The Company is registered under the name of St. Bees Gas Company (1938), Ltd.

**Authorization to Raise £25,000 Additional Capital** by the creation and issue of ordinary or preference shares constitutes the principal provision of an Order under Section I. of the Gas Undertakings Act, 1929, for which the Altrincham Gas Company intend to apply to the Board of Trade.

**A Reduced Tariff** applying to gas supplied for central heating has been adopted by the Mansfield Town Council. To consumers of 50 000 cu.ft. and under per quarter the charge will be 2s. per 1,000 cu.ft.; 50,000 to 1,000,000 cu.ft. per quarter 1s. 6d. per 1,000 cu.ft.; 1,000,000 cu.ft. and over per quarter 1s. 3d. per 1,000 cu.ft.

**The Possibility of a Bulk Supply** is being explored by the Oswaldtwistle Gas Committee. Should the Committee decide on this course, it is estimated that the cost of connecting the town mains to a pipeline at Altham would be between £3,000 and £3,500, but after this was done the equivalent of an 8d. rate would be saved yearly.

**A Striking Display** of "Ascot" products by the Pudsey Gas Company took part in the procession organized by the local Medical Charities Committee. The value of this form of publicity is shown by the fact that the Company's Showroom staff during the next few days were kept busy answering enquiries and giving out literature concerning the appliances seen in the display.

**An Extension of the Limits of Supply** to include parts of the urban district of Solihull, in the County of Warwick, and to prohibit the Solihull Gas Company from exercising within the added limits any of the powers conferred upon them in respect of their Undertaking, is among the provisions of a Special Order for which the Birmingham Corporation Gas Department intend to apply to the Board of Trade under the Gas Undertakings Acts, 1920 to 1934.

**The Purchase of the Undertaking** of the Burwash Gas Company is one of the provisions of a Special Order for which the Wadhurst and District Gas and Coke Company intend to apply to the Board of Trade under the Gas Undertakings Acts, 1920 to 1934. The Wadhurst Undertaking is controlled by the General Gas and Electricity Company, Ltd., and among other provisions of the Order are the following: To change the name of the Company; to extend the limits of supply, and to prohibit the Tunbridge Wells Gas Company and the Mid-Kent Gas Light and Coke Company from exercising any powers in such parts of the added limits as are within the limits of supply of those Companies; to empower the Company to create and issue additional debenture stock; and for other purposes.

**For the Next Five Years** at least the majority of the street lamps in Slough will continue to be lighted by gas. At the June meeting of the Slough Urban Council the Highways Committee reported they had given lengthy consideration to the question of renewing the public lighting contract with the Slough Gas and Coke Company and "were pleased to report that a satisfactory arrangement has been arrived at with the Company." The Committee recommended that a contract to be entered into with the Company for the supply of gas and maintenance over a period of five years from April 1, 1938, to not less than 894 public lamps irrespective of size, in accordance with the Company's schedule. In this way, the report added, a saving would be made in the cost of public lighting. The Council agreed to the contract being confirmed.

**An Increase** in the price of gas by 2d. per 1,000 cu.ft. is announced by the Dundee Corporation.

**To Regulate the Emission of Black Smoke** from a chimney of any building other than a private house is the subject of a By-law made by the Barking Borough Council for which they intend to seek the confirmation of the Ministry of Health under Section 104 (I.) of the Public Health Act, 1936.

**An Interesting Feature** of the annual report of Mr. John Maxwell, Chief Constable of Manchester, is the statistical table in which he makes an analysis of the causes of fire at the 929 city premises to which the fire brigade were summoned. Compared with only ten fires caused through defective gas fittings no fewer than 81 fires were caused by electricity and electric light.

**Negotiations for the Improvement of Street Lighting** in South Shields have taken place between the South Shields Town Council and the Newcastle-upon-Tyne and Gateshead Gas Company. If the Corporation is willing to enter into a ten-year contract the Company is prepared to install better lighting in secondary streets and extend lighting columns. The Company has also offered to reduce its charges for street lighting. The Council has been recommended by its Parliamentary Committee to accept the Company's offer, subject to the contract being for five years instead of ten.

**For the Modernization** of their Gas-Works, the Doncaster Town Council-in-Committee decided on June 30 to invite tenders from selected firms for vertical retorts, washing plant, &c. The scheme is estimated to cost between £85,000 and £90,000. Full Council confirmation is expected. The scheme is alternative to approval given in May to an agreement for taking gas in bulk from the Sheffield Gas Company, and is the result of the Sheffield Bill being rejected by the House of Lords Select Committee. The proposal now advanced by the Gas Committee was one approved by a minority at the May meeting of the Council.

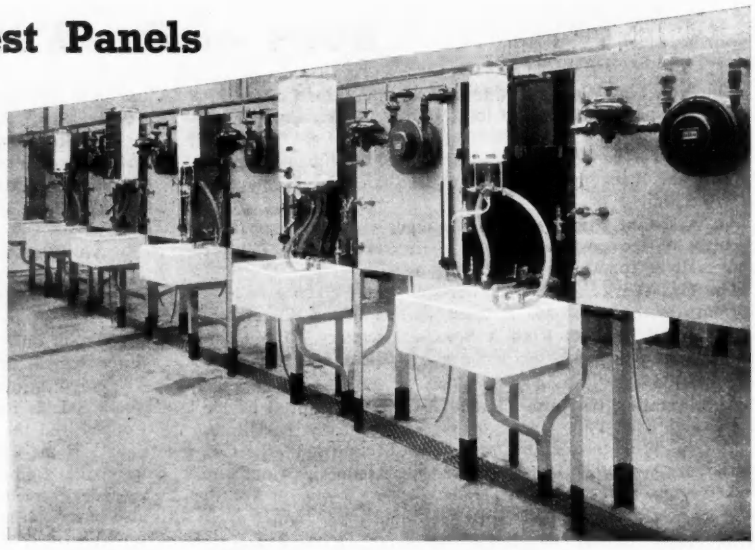
**At the Annual Summer Conference** of the Industrial Copartnership Association which is to be held at Wills Hall, Bristol, during the week-end, Sir Robert Kindersley will give the opening Address on "Stability in the Economic System." The Conference will consider the "Stability of Industry and the Security of Employment." Among others who will take part are Sir George Paish, the well-known economist and formerly Editor of the *Statist*, and Sir Henry Bunbury, K.C.B., until recently Comptroller and Accountant-General of the Post Office. Further information may be had from the Secretary, Industrial Copartnership Association, 36, Victoria Street, S.W. 1.

**Air Raid Precautions** taken by the Plymouth and Stonehouse Gas Light and Coke Company were mentioned by the Chairman and Managing Director, Colonel R. L. Norrington, at the annual general meeting of the Company on June 23. He said the Company had sent a member of their staff to one of the Government establishments in the North of England to undergo a comprehensive course of instruction, and he was now a duly qualified instructor. They were building up their own squad and were hoping to make themselves entirely self-supporting as far as their own Works were concerned. About 95% of their employees had volunteered for duty. The possibility of making use of an old tunnel at the Company's Works at Coxside as part of a scheme was mentioned subsequently by Colonel Norrington.

**That Increased Cost of Production** might necessitate a decrease in the rate of future dividends was also intimated by Colonel Norrington. He said that the increases in the cost of coal, oil, and materials generally, as well as rises in wages, had rendered necessary a revision of the charges for gas, but the burden could not rest only on the shoulders of the consumers. He added that it was not possible to say at this juncture just what the decrease was likely to be, but he hoped and believed that the Company would have a satisfactory year's trading and that no great sacrifice on the part of the shareholders would be called for. Referring to the forthcoming extension of the boundaries of the city of Plymouth, Colonel Norrington said they arranged for the necessary clause protecting their interests in the added areas now administered by the Plympton authority to be inserted in the Bill, and their position would therefore be unchanged.

# Radiation Heater Test Panels

The final tests of Radiation heaters are carried through by expert testers on specially designed test panels, a portion of which is shown in the accompanying photograph. These are fitted with controls, by means of which varying pressures of gas and water supplies to meet all conditions can be reproduced. The necessary gas and water pressure gauges are included, and gas meters to check consumption. These tests ensure that the heaters will operate to the highest satisfaction under varying conditions of gas pressure, calorific value, and water pressures from 3 ft. head up to the highest main water pressure obtaining.



# Tar and Ammonia in 1937

## Increased Production

The following information is extracted from the Report for 1937 of the Chief Inspectors of Alkali, &c., Works (H.M. Stationery Office, price 1s.).

TABLE 1.—*Ammonia Products Manufactured in England and Wales.*
[Expressed as Sulphate ($25\frac{3}{4}\%$ $NH_3$)—Tons.]

| From Liquor Produced in— | 1937. | 1936. | 1935. |
|---|---|---|---|
| Gas-works .. .. .. .. .. | 122,400 | 120,300 | 109,200 |
| Other works (including coke ovens, iron works, producer-gas, synthetic, &c.) .. | 535,600 | 455,100 | 461,700 |
| Total .. .. .. .. | 658,000 | 575,400 | 570,900 |

NOTE.—Of the above total, the equivalent of 112,200 tons was manufactured as concentrated liquor, and 34,000 tons of this concentrated liquor was subsequently converted to salts, which are included in the 658,000 tons above. The total quantity of salts of ammonia produced, therefore, was 545,800 tons and the net production of ammonia was 624,000 tons.

TABLE 2.—*Tar Treated in England and Wales.*
[Tons.]

| Origin. | Tar Distilled. | Pitch Produced. |
|---|---|---|
| Gas-works .. .. .. .. .. | 1,084,000 | 281,200 |
| Coke ovens .. .. .. .. .. | 787,700 | 312,000 |
| Other works .. .. .. .. .. | 32,200 | 11,300 |
| Total .. .. .. .. | 1,903,900 | 604,500 |

NOTE.—Of the above total quantity of tar, it is estimated that 1,126,700 tons were distilled for the production of pitch, the balance of 777,200 tons being treat d only for the preparation of road tar, &c.

TABLE 3.—*Salts of Ammonia Made in Scotland.*
[Expressed as Sulphate.]

| —— | 1937. | 1936. | 1935. |
|---|---|---|---|
| | Tons. | Tons. | Tons. |
| Gas-works .. .. .. .. | 15,594 | 13,245 | 12,269 |
| Iron works .. .. .. .. | 278 | 215 | 295 |
| Coke ovens .. .. .. .. | 9,672 | 7,404 | 6,392 |
| Shale works .. .. .. | 24,679 | 25,398 | 25,240 |
| Total .. .. .. | 50,223 | 46,262 | 44,196 |

NOTE.—Included in the 1937 total are 1,101 tons recovered as liquor ammonia and 31 tons as ammonium chloride.

TABLE 4.—*Tar Made in Scotland.*

| —— | 1937. Tar Distilled. | 1937. Pitch Produced. | 1936. Tar Distilled. | 1935. Tar Distilled. |
|---|---|---|---|---|
| | Tons. | Tons. | Tons. | Tons. |
| Gas-works .. | 153,502 | 40,852 | 142,335 | 130,067 |
| Iron works .. | 3,999 | 2,084 | 2,345 | 4,932 |
| Coke ovens .. | 33,549 | 10,829 | 28,366 | 20,509 |
| Producer gas .. | — | — | — | 127 |
| Total .. | 191,050 | 53,765 | 173,046 | 155,635 |

# The B.C.G.A.

## Twenty-Seventh Annual General Meeting

By invitation of the Chairman and Directors of the Brighton, Hove, and Worthing Gas Company, the Twenty-Seventh Annual General Meeting and Conference of the B.C.G.A. will be held at Brighton from, and including, Saturday, Oct. 1, to the afternoon of Tuesday, Oct. 4. Mr. A. M. Paddon, the Association's President and Chairman of the Brighton, Hove, and Worthing Gas Company, will preside.

A programme outstanding in interest to members and importance to the Industry is being arranged, and includes a Reception by the President and Mrs. Paddon, and a Civic Reception on the evening of Saturday, Oct. 1. Lord Horder and Mr. Herbert Morrison, M.P., have kindly accepted invitations to the Conference, and will be included among the distinguished speakers.

Brighton offers a liberal choice of hotel accommodation, but to make sure of their reservations, members are recommended by the Association to book well in advance. All applications should be made direct to the hotels.

### PROVISIONAL PROGRAMME.

**Saturday, Oct. 1.**

Afternoon : *Reception by the President and Mrs. Paddon at the Royal Pavilion. Tea.
Evening : *Civic Reception at the Dome or Corn Exchange. Dancing. Refreshments.

**Sunday, Oct. 2.**

Morning : *Golf.
Afternoon : *Visit to Glyndebourne Opera House. Concert. Tea.
Evening : *Premiere Performance of New Gas Industry Films at the Dome.

**Monday, Oct. 3.**

Morning : ANNUAL GENERAL MEETING at the Royal Pavilion.
Presidential Address.
First Business Session.
1.0 p.m. : *Informal Lunch at Corn Exchange.
Afternoon : Second Business Session.
Ladies : Tour of "Unknown Sussex."
Evening : Banquet by invitation of the Brighton, Hove, and Worthing Gas Company, at the Dome.
Ladies : Reception and Conversazione by the Women's Gas Council, at the Royal Pavilion.

**Tuesday, Oct. 4.**

Morning : Third Business Session at the Royal Pavilion.
1.0 p.m. : Lunch by the President and Members to the Retiring President, at the Corn Exchange.
Afternoon : *Alternative Visits to :
H. J. Green & Co., Ltd. (Works). Tea.
Diaphragm and General Leather Company, Ltd. (Works). Tea.
Littlehampton Showrooms. Tea.

The Gas-Works to be open for inspection during the Conference.

* Ladies invited.

## Theoretical and Practical Training of Gas Engineers

A translation has been made of a booklet reprinted from the columns of the Polish Technical Journal, "Gas, Water, and Sanitary Technique," by Mr. Czeslaw Swierczewski, formerly Chief Director of the Warsaw Municipal Gas Undertaking, a post from which he retired a few years ago. Mr. Swierczewski is now President of the Gasification Section of the Polish Committee of the World Power Conference. The present book is an enlargement of a lecture on the same subject which Mr. Swierczewski gave at the 19th annual meeting of the Polish Gas and Water Engineers last year.

It describes the education and training of gas engineers in the several countries of Europe with a rather brief reference to that in the United States of America.

Mr. Swierczewski begins by re-stating the complexity of the problems with which the gas engineer is called upon to deal, and the great variety of chemical, physical, mechanical, and commercial subjects of which he must have a scund scientific knowledge. He then proceeds to describe very fully the educational system in England, where, he says, "The Gas Industry, possessing its own constitution based upon Parliamentary enactments, is the oldest in the world and occupies a leading position in regard to development." The Institution Education Scheme and the Fuel Department at Leeds University are fully described with all details of syllabuses. Evidently Mr. Swierczewski is impressed with the fact that the education and training of gas engineers in this country is worthy of the position held by Great Britain in the Gas Industry of the world.

In Germany, though Karlsruhe preceded the Leeds faculty by some years, education in gas technology is not so completely coordinated throughout the country. But Technical High Schools in Berlin, Breslau, Darnstadt, and Munich all include series of lectures in the Technology of Fuel with reference in varying degrees of importance to gas, and other similar schools are contemplating the adoption of similar courses.

In France higher education is given to engineers with two years' practice in the gas-works, or with gas engineering contractors, in the form of three courses of lectures each year held in Paris and each extending over a fortnight, "of which the first is between Oct. 2 and 15, and covers lectures only, the second is between Jan. 2 and 15, and comprises in addition to lectures also practical work, and the third takes place between April 2 and 15, and provides lectures, debates on projects drawn up in the interim," and visits to works and plant.

Czechoslovakia caters for the young gas engineer at the Technical High School in Prague where lectures are given on the "technology of fuel and lighting materials" (there is an Assistant Professor of "building and equipment of gas-works"), and at Brno there is a lectureship in the "technology of fuels" in which lectures are given on gas engineering by Dr. Perna, the Director of the Gas-Works at Brno.

The section dealing with Poland is naturally devoted to pleading for extensions in educational facilities for gas engineers, but already this subject is covered by lectures at the Warsaw Higher Engineering School by professors of organic chemistry and by special lectures.

The book is one which might well be consulted by those interested in the comparative study of vocational education, particularly in relation to the Gas Industry.

T. A. T.

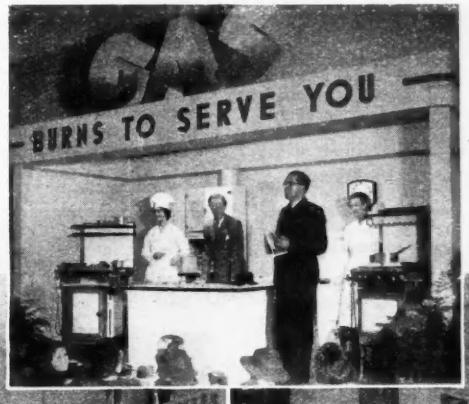
## Examination of Water-Sealed Holders

The Secretary of State has issued an Order—the Gasholders (Record of Examinations) Order, 1938—concerned with the examination of water-sealed holders. It is under section 33 (*a*) of the Factories Act, 1937. The record required must include the following particulars:

Name of occupier and address of factory; distinguishing number or letter and type of holder; number of lifts, maximum capacity in cubic feet, and pressure thrown by holder when full; particulars as to the condition of crown, side sheeting, including cups and grips, guiding mechanism (roller carriages, rollers, pins, guides, rails, or ropes), tank, and other structure (columns, framing, and bracing); particulars as to the position of the lifts at the time of examination; particulars as to whether the tanks and lifts were found sufficiently level, and, if not, as to the steps taken to remedy the defect; and date of examination and by whom it was carried out.

The Order is published by H.M. Stationery Office, price 1d.

## Famous People Visit Dorking Gas Display



A magnificent display of gas appliances, together with cookery demonstrations, was organized by the East Surrey Gas Company at the recent Dorking Trades Exhibition. Our two centre photographs show the comprehensive nature of the Gas Company's show, which occupied considerable space.

Several well-known figures visited the Exhibition. The top picture is of Mr. Leslie Howard presenting the prizes for the Cake Baking Competition, while below we see Mr. and Mrs. Ben Foord interested in an "Ascot" boiling water appliance. With them is Mr. Arthur Tennant, the Company's Sales Manager.

## Home and Beauty Demonstrations

The Manchester Branch of the Women's Gas Council recently organized a series of "Home and Beauty" Demonstrations in the Town Hall. No fewer than 800 members attended during the nine days, representing a 75% response to the invitations sent out. Each day a member volunteered to be made up, and our photograph shows one of these "operations" in progress. Tea and cakes were served in the showroom afterwards.

## The University of Leeds

### Degree Examination Results

The following results have been declared of the Final Degree Examinations at the University of Leeds (Department of Coal Gas and Fuel Industries with Metallurgy).

**Gas Engineering.**

D.Sc.—H. Hollings, M.Sc.

B.Sc. Honours: Class I.—G. Brook, B.Sc., for a thesis entitled "A Study of the Behaviour of Refractory Materials under Torsion at Different Temperatures, with Special Reference to (*a*) Kaolin + 10 and 30% Fluxes; (*b*) Kaolin-Quartz + 10 and 30% Fluxes; (*c*) Various Basic Materials for use in Steel Furnaces."

A. Milner, for a thesis entitled "The Behaviour of Refractory Materials Under Conditions of Fluctuating Temperature and Thermal Shock, with Special Reference to Changes in the Modulus of Rigidity and the Ultimate Sheer Strength."

S. Muller, for a thesis entitled "The Action of Steam on Carbon."

B.Sc. Honours: Class II.—F. Taylor, for a thesis entitled "Corrosion in the Products of Combustion of Coal Gas."

H. Taylor, for a thesis entitled "The Influence of Size of Coke Particle upon its reactivity to Carbon Dioxide."

G. A. Woodwark, for a thesis entitled, "A Study in Test Burner Performance."

B.Sc. Ordinary.—W. Dougall.
G. R. Saville.

**Fuel and Metallurgy.**

B.Sc. Honours.—R. V. Riley, for a thesis entitled "The Scaling of Some Non-Ferrous Metals and Alloys in the Gaseous Products of Combustion of Fuels."

B.Sc. Ordinary.—A. T. Barlow.

**Diploma in Fuel and Metallurgy.**

L. E. Holliday, B.Sc.
G. Parker, B.Sc.

Mr. H. Hollings, who has been awarded the Degree of D.Sc., held the Institution Gas Research Fellowship in 1912-14, and is Chief Gas Chemist to the Gas Light and Coke Company.

Mr. W. Dougall is a member of a well-known gas engineering family, and the son of a former Engineer and Manager of the Wellington Gas Company, New Zealand.

Mr. G. R. Saville is the son of Mr. H. Saville, Director of Messrs. F. C. Sugden and Co., Gas Engineers, Leeds.

Mr. H. Taylor, B.Sc., has recently been appointed to the staff of the Newark Corporation Gas Department.

## Atmosphere Control Furnaces

### A Sheffield Development

In last week's "JOURNAL" (p. 1049) we published an illustration of the atmosphere control furnaces exhibited by the Sheffield Gas Company on the stand of the British Gas Federation at the Empire Exhibition, Glasgow. The design and arrangement of these furnaces have been introduced to add still further to the uses of the atmosphere control process developed by the Company.

The process has been applied already to various designs of furnace for the heat-treatment of high speed steel tools such as small drills, large drills and broaches, reamers, hobs, taps and dies, milling cutters, and lathe tools. The process is such that it prevents surface damage to steels during their heat treatment, and has been proved particularly successful by many well known steel and engineering companies, both in this country and abroad.

The new arrangement of furnaces enables larger tools of high speed steel, such as large milling cutters, dies, &c., to be given the same degree of precision hardening as is given to the smaller tools in furnaces embodying the Sheffield atmosphere control process and automatic temperature control. One of the two furnaces is used for temperatures up to 850° C. for pre-heating purposes, and also supplies the purging gases for atmosphere control for both furnaces. This furnace can also be used as a separate unit for steels only requiring temperatures up to about 1,000° C. The second furnace is for high temperature purposes with a working temperature up to 1,400° C., and is under complete automatic control of temperature as well as atmosphere control.

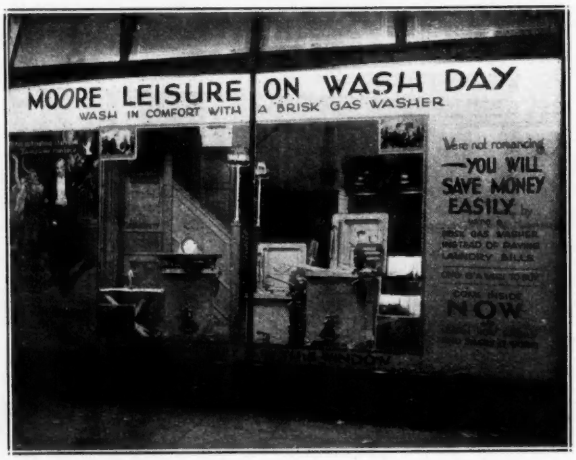
The same degree of scientific precision hardening is obtained with this arrangement of furnaces as is obtained with the other well proved designs of Sheffield type atmosphere controlled furnaces.

## Tar Carpets

A helpful and well written booklet entitled "Tar Carpets for Safe Roads" has been published by the London and Counties Road Tar Association. It deals briefly with the principle of design of a tar carpet, its uses, its cost, the aggregates from which it can be made, and why a special tar is necessary. Typical specifications for tar carpets are set out, and general instructions for laying are given.

The booklet has been distributed among the surveyors and highway engineers in the South of England, and copies may be obtained on application to the Association at 84, Horseferry Road, Westminster, S.W. 1.

## A Washing Machine Display




This effective display was arranged in one of the Central Showroom Windows of the Coventry Gas Department recently, linking-up with the principal film at a local cinema. It created considerable interest, and washing machine sales, which have been consistently good during the past four months, reached the excellent total of 31 for this particular week.

# Members of Coke Salesmen's Circle

## Inspect Grass-Drying Plant

**Some fifty members of the London and Counties Coke Salesmen's Circle spent a most enjoyable day on June 15, when they had the opportunity—for many of them the first—of inspecting a coke-fired grass-drying plant in operation near Romsey, in Hampshire.**

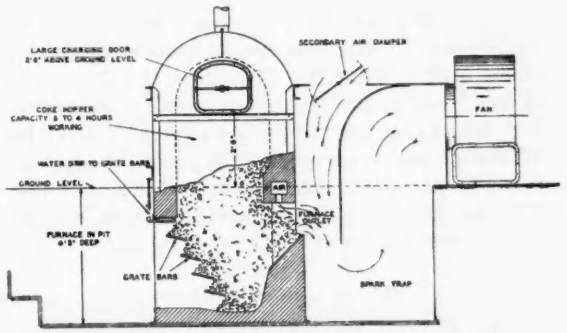



Diagram of Semi-Producer Furnace for Grass-Drying.

The party gathered at the White Horse Hotel, Romsey—incidentally, one of England's notable old inns—for luncheon, among those present being Mr. W. L. Boon (General Manager of the L.C.C.A.) and Mr. S. E. Whitehead (Director, Engineer, and General Manager of the Southampton Gaslight and Coke Company).

There is no need to digress here upon the attractions of Romsey, save in so far as it provides an opportunity for congratulating the organizers of the outing upon choosing a venue not only famous for its magnificent Abbey—probably the finest example of Norman work still standing—but also known far and wide as one of England's premier beauty spots. It is therefore no injustice to the members or to the grass-drying plant to record that they were equally attracted by the natural beauties which surrounded them on every side and as a result voted the day thoroughly well spent.

The drying plant, which is one of the first of the modern type of drier to be put to work in this country, is on the Embley Park Estate, some two miles out of Romsey; the property of Mr. J. J. Crosfield, J.P., who is well known for his helpful encouragement to the development of the new agricultural plant. It was on Mr. Crosfield's Estate that some of the earliest experiments in artificial grass drying were carried out in 1925, by means of blowing hot air through the centre of specially built-up stacks of grass.

In general principles and appearance, however, it may be said that the plant is not unlike that at Chessington, which we described in detail in the "JOURNAL" for June 2 last year, though its capacity is slightly less than the Surrey plant.

The furnace is similar in many respects to a producer furnace, but the effective firebed is only 2 ft. 6 in. thick and is always flaming at the outlet, so that there is no possibility of inflammable gases leaving the outlet unignited—such as could occur in the usual producer furnace. The furnace is constructed of brick with a firebrick lining, tied together with the usual angle and channel framing, and has a step grate with wide spaces between the bars for easy removal of any clinker that may be formed.

The furnace outlets comprise a series of columns formed of firebricks, with similar sized bricks laid across the top, thus providing a simple construction and eliminating the use of brick arches. The top of the furnace is arched, and a large charging door is provided in the side.

On the furnace top a vent pipe is fitted with a "butterfly" valve which has to be opened before the furnace door can be opened, thereby allowing the escape, before the door is opened, of any gases which may have collected in the top of the coke hopper. A water drip is carried to the grate bars to promote a water gas reaction in the fuel bed. The furnace is rated to burn 2½ cwt. of coke per hour.

The temperature of the gases at the outlet of the furnace is about 1,000° F., which is reduced by the admission of suitable quantities of fresh air to a temperature of 280°-300° for the drying process. The diluted gases are drawn by means of a fan, driven by belting from an adjacent tractor, through a spark trap, and a drier designed to produce from 3 to 5 cwt. of dried grass per hour (according, of course, to moisture content) requires a delivery of approximately 20,000 cu.ft. of gases per minute at this temperature through the product.

Further points in connexion with the plant are that full temperature can be obtained and drying commenced within 50 to 60 minutes of lighting up, while the heat output is so steady that it is hardly considered necessary to fit thermostatic control.

In the case of batch drying of grass, where part of the air is re-circulated, the furnace is very responsive to a quick pick-up in temperature at the beginning of each cycle. When stopping for short periods—such as the dinner-hour—the front and rear doors are closed and the fan is stopped. The plant can commence drying again immediately the fan is re-started.

When banking up for the night the furnace doors are closed, and the coke in the hopper above is damped with a spray of water from a perforated pipe running through the top of the furnace. The fuel consumption during a 12-hour banking period is approximately equivalent to one hour's rated consumption—*i.e.*, a furnace rated at 2 cwt. per hour will consume about 2 cwt. during the 12-hour banking period. After being banked up for the night full temperature can be attained and drying commenced within five minutes. The furnace will run for 16 hours without clinkering, while its design is such that only a small amount of clinker is formed, and this is easily removed by pulling through the wide spaces between the grate bars; clinkering occupies only a few minutes.

### The Drying Section.

The drying section of the plant consists of four trays, the two outside trays taking the newly-cut grass for preliminary drying, while the two inner trays are covered compartments in which the drying process is completed. A hand-controlled valve diverts the hot gases either to the two left-hand trays or to the two right-hand trays, the covered section being moved to enclose either one or other of the centre sections according to which side is actually drying the grass. The hot products passing up through the grass in the outside trays are blown to atmosphere, while those passing through the grass in the enclosed tray are drawn back and re-circulated through the fan.

The cycle of operation is as follows: After 15 to 20 minutes (according to the moisture of the product) of preliminary drying in the left-hand outer tray, the grass is forked into the left-hand inner tray and the cover rolled into position above the latter. In the meantime a fresh load of grass is placed in the outside tray. On completion of drying in the left-hand inner tray, the cover is rolled across to the right-hand inner tray into which another partially dried load has previously been forked from the right-hand outer tray in which it has been partially dried, and at the same time the valve is switched over to divert the hot gases through the two right-hand sections. The inner left-hand tray is then emptied of the completely dried grass and filled again with the partially dried product from the left-hand outer tray—and so on.

It will be appreciated that as soon as the hot gases are diverted to the new section there will be a considerable drop in temperature as a result of the large amount of moisture through which they have to pass. In order to counterbalance this drop in the temperature of the re-circulated gases, therefore, the air inlet damper on the furnace is partially closed for a few minutes. The damper is subsequently opened again as the drying process progresses.

The completely dried grass is forked out on to a platform and passed to the baling machine.

Following the inspection of the cutting, drying, and baling processes, the members of the Circle had the privilege of being conducted through the delightful gardens and woods of the estate, where, amid surroundings of rolling lawns, shrubberies, lakes, and trickling brooks, many rare and beautiful plants are grown. We hesitate to attempt any record here of the lengthy names by which some of these exotic growths are technically known; but judging from the absorbed interest of the gardening enthusiasts among the party they must include plants which are the envy of the botanical world. After a final peep into the "kitchen garden," where we glimpsed the cultivation of grapes and melons, as well as many other fruits and flowers in hothouses, we said good-bye to Romsey and set out for home, stopping *en route* for tea at Winchester.

# Woodall-Duckham Static Vertical Retort

**On Thursday last the Southern Association of Gas Engineers and Managers (Eastern District), at the invitation of the Chairman and Directors of the Croydon Gas Company, spent an enjoyable day inspecting the Company's Works and the William Cash workshops. Of great interest at the Works was a test installation of the new Woodall-Duckham Static Vertical Retort, a brief description of which we give here.**

The evolution of the W-D static vertical retort may be considered to start with the filing of a patent application by the late Sir Arthur Duckham in June, 1930 (B.P. 357146). The static vertical retort consists fundamentally of an intermittently operated two-stage vertical carbonizing retort divided into two portions one above the other, the upper of which forms a coal carbonizing zone and is heated by means of external flues, while the lower portion forms a zone in which the coke is cooled, partly by means of steam and partly by means of the surrounding atmosphere. The steam ascends in contact with the coke and forms water gas which mixes with the coal gas liberated from the coal undergoing carbonization in the zone above.

During the period 1930-35 a number of installations of intermittent vertical chambers were built in Great Britain. In one particular direction intermittent vertical chambers gave room for improvement, and that was in the quenching of the coke. During this same period attention had been drawn to the possibility of improving the yield of gas from the carbonization of coal by what has generally become recognized as the controlled cracking of hydrocarbons in the presence of hydrogen.

If the advantages of the intermittent vertical chamber process could be associated with the advantages of the continuous vertical retort process as regards the extraction of cool coke and continuous steaming, it was realized that an improvement in technique would result. These combined features led the Woodall-Duckham Company to design a new form of carbonizing plant which embodied the essential features of Sir Arthur Duckham's 1930 patent.

By the courtesy of the Directors of the Croydon Gas Company an arrangement was reached in 1935 whereby the Woodall-Duckham Company was permitted to erect and operate a full scale test installation at the Waddon Works of the Croydon Company. The experience gained in the design and construction of continuous vertical retorts and of intermittent vertical chambers enabled the Woodall-Duckham Company to evolve with some degree of assurance a design of plant to suit this new process. The test installation was put to work in April, 1936, and worked until July, 1937, when it was temporarily shut down owing to seasonal demands on the operating staff, Part I. of the experimental programme having been completed and the soundness of the process demonstrated. The plant was restarted in April, 1938, and a further programme of tests is in progress with the object of collecting data from all classes of coals to form a basis for guarantees. Over 1,000 charges of coal have been carbonized, including Durham run-of-mine, Yorkshire screened, Yorkshire nuts, and Derbyshire screened coals. Throughout the whole test the plant has given no trouble in any way.

The test installation consists of a full size unit with a daily gas output of approximately 100,000 cu.ft., together with a complete installation of ancillary plant for the collection and measurement of the products.

The carbonizing zone of the static vertical retort consists of a vertical retort, rectangular in plan, built of silica. Heating flues are provided on each side of the retort. The heating system is of the well-established "lambent" type. Hot producer gas is made in a step-grate producer situated at ground level. The cooling chamber is constructed of mild steel lined with firebrick. Beneath the coke cooling chamber is placed a cast-iron box fitted with a discharge door and containing a coke extracting device of the type employed in Woodall-Duckham continuous vertical retorts. Beneath this discharge door is a coke measuring container of adjustable capacity.

The ancillary plant consists of water tube condenser, exhauster with by-pass governor, Livesey washer, and rotary brush washer. Gas is measured in a standard type wet meter with a stainless steel drum to which is geared a small wet meter for taking gas samples, correctly proportioned to each cubic foot of gas made. The calorific value of gas is determined by means of a Boys calorimeter on collected proportional gas samples. All coal to the plant is weighed on a certified weighbridge. The plant has self-contained liquor circulating and tar and liquor measuring systems.

When carbonization of the coal charge in the vertical retort is complete the coke discharge door is opened and the coke extractor rotated until the required amount of cooled coke from the cooling chamber is removed, the quantity extracted being measured in the coke container. The removal of the cool coke at the bottom allows the red hot coke in the carbonizing zone to descend into the cooling chamber. The carbonizing chamber is recharged with coal and the carbonization of the new charge then commences. While the coal charge is being carbonized in the retort proper the coke is being cooled in the cooling chamber by means of steam and natural convection and radiation. The carbonizing cycle takes from 8-10 hours, according to the type of coal being carbonized and the calorific value of the gas being made.

## Great Developments at the Waddon Works.

The visitors were entertained at luncheon in the Croydon Company's fine sports pavilion at South Beddington, Mr. WILLIAM CASH, Chairman of Directors, presiding.

Proposing the toast of the Southern Association, Eastern District, Mr. CASH gave the visitors a warm welcome and said how fortunate the Gas Industry was in its personnel on the engineering and managerial side. The spirit in which they worked was one of co-operation and new ideas were freely interchanged for the benefit of all; and their sympathetic attitude in the control of their workpeople was wholly admirable. He hoped the Association had found the visit to the Works of interest and perhaps value. No doubt they would have been especially interested in the experimental installation of the Woodall-Duckham static vertical retort, which had been in operation for a considerable time. He understood that installations on this principle were to be erected at Southampton and Cambridge.

The reply to the toast was in the hands of Mr. F. J. ROBINSON, Chairman of the Eastern District, who thanked the Croydon Gas Company for their hospitality and referred to the value of visits such as that arranged for that day, particularly to those in charge of the smaller undertakings.

The other toast was that of the Croydon Gas Company, which was proposed by Mr. H. C. Smith, Past-President of The Institution of Gas Engineers, who spoke of the wonderful developments at the Croydon Gas-Works—developments which were the result of careful planning, for which Mr. Grogono, the Engineer, had been mainly responsible. As for their Chairman, the name of Cash was an honoured one in the Gas Industry, and the Industry owed a debt of gratitude to Mr. Cash for the vast amount of voluntary work he undertook to foster its progress.

Response was to have been made by Mr. W. J. Sandeman, General Manager of the Company, but, as Mr. Cash informed the gathering, unfortunately Mr. Sandeman was not in the best of health and acting on medical advice was taking a rest. In his absence Mr. Walter Grogono thanked Mr. Smith for his kind remarks and expressed the hope that the visitors had had an interesting morning inspecting the Waddon Works. In regard to the static vertical retort, he felt sure that much more would be heard of this development in the future.

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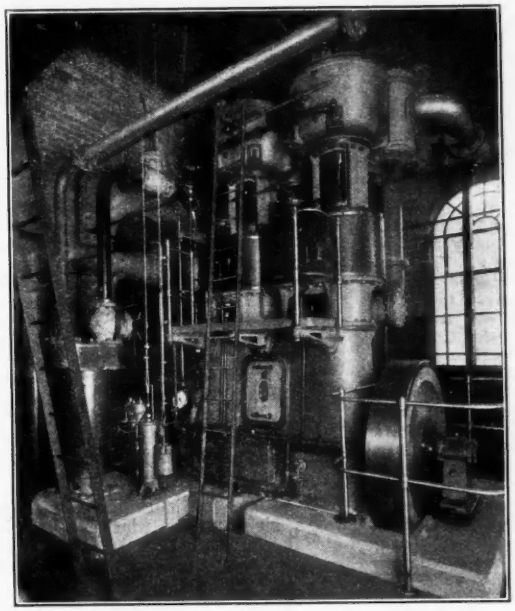
On making enquiry we find that the Southampton installation of static verticals referred to by Mr. Cash will have a capacity of about 2½ million cu.ft. of gas a day and that at Cambridge of approximately 1½ million cu.ft. a day.

# Steam-Driven Gas Compressors at Newcastle

Two large compressors for the Elswick and North Shields Works of the Newcastle-upon-Tyne and Gateshead Gas Company have recently been completed by Messrs. J. Browett Lindley (1931), Ltd., Letchworth, Herts. Each compressor has a capacity of 2,000 cu.ft. per minute at any pressure between 5 and 30 lb. per sq.in., according to the requirements of the gasholders. The compressors are of the two crank non-compound steam driven tandem type and are supplied with steam at a pressure of 90 lb. per sq.in. (gauge). When on maximum output they run at a speed of 375 r.p.m.



Showing the Browett-Lindley Compressor at the Elswick Works of the Newcastle-upon-Tyne and Gateshead Gas Company.

The two compressors are practically identical in design, but one of them (at the Elswick Works, illustrated in our photograph) is so arranged that it can be modified at a later date to act as a compound engine. To secure this end, a special liner can be removed from the L.P. cylinder and at the same time a larger piston will be substituted. The present cylinder dimensions of both the engines are 15½ in. × 15½ in. × 10 in. stroke. The engine at the Elswick Works will, however, be modified to 15½ in. × 22 in. when arranged for compound operation. In all cases the gas cylinders are 19½ in. in diameter.

Each of the four cylinders is a separate casting of hard close-grained cast iron and it will be clear from the sectional diagram that the gas cylinders are mounted above the steam cylinders on cast iron distance pieces. The steam cylinders and covers are lagged with a layer of magnesia non-conducting composition covered with planished steel sheeting, whereas the corresponding gas cylinders and their covers are, of course, water-jacketed.

The pistons for the low pressure steam cylinders and gas cylinders are of cast steel, whereas the steam pistons are of cast iron. The rings in the gas pistons are of the Ramsbottom type. In the case of the steam pistons, however, the rings are of the restrained type and are designed to work without pressure on the cylinder walls.

## Accessibility.

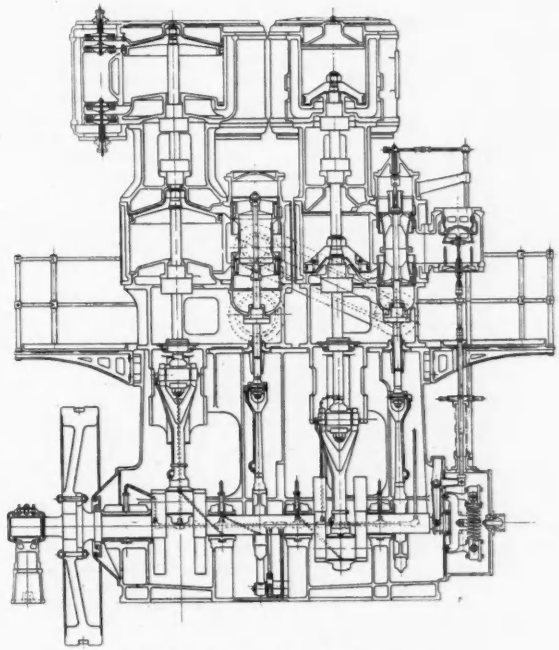
Accessibility is a special feature throughout and it is of interest that the main bearings (which consist of adjustable cast iron shells, lined with white metal) may be removed without disturbing the crankshaft. The latter is a solid forging of Siemens-Martin acid mild steel and is accurately machined all over. The two steam piston valves are of special cast iron and are fitted with hand expansion gear. The valves are situated directly over the crankshaft, without any set on the eccentric rod, the arrangement giving the minimum of friction during adjustment of the steam cut-off and a minimum of wear.

Concerning the valves on the gas cylinders, these are of the Hoerbiger disc type in tempered steel for both the suction and the delivery sides. They are designed to withstand the chemical action of certain constituents in the gas. They are automatically operated and are arranged for a very small vertical lift so that wear is reduced to negligible proportions. The main governor is of the plain centrifugal type mounted on the end of the crankshaft. This controls the maximum speed of the compressor by acting directly on the steam throttle valve, but only comes into operation in the event of failure of the other control devices.

## Lubrication.

All the working joints of the governor are fitted with case-hardened pins, lubricated by oil under pressure, and it might be mentioned that the entire bearing surfaces of the engine are similarly supplied with oil from a valveless pump located in an easily accessible position in the lower part of the bedplate. The cylinders are, however, supplied by a mechanically-driven lubricator with an independent pump and sight feed for each cylinder.

Each machine is provided with two gas control devices—*i.e.*, a variable speed control and an over-pressure release system. Concerning the former, when the gas pressure in the delivery main rises above a pre-determined value, owing to decreased demand, a diaphragm-type relay valve comes into operation. This releases a needle valve, admitting water into a cylinder and causing a rise or fall of a piston which is connected directly to a balanced throttle valve on the steam supply. By means of a compensating device, a position of equilibrium is reached and the set is thus automatically adjusted to run at an intermediate speed (between full and no load values) so as to keep the pressure at the required figure.



Sectional Illustration of Compressor.

If the demand for gas should cease altogether, the above variable speed control device will slow down the set to a predetermined minimum value. Compression will still be taking place slowly in these circumstances, and at a further specified value of the outlet pressure an outlet control valve comes into operation totally unloading the pressure of compressed gas and by-passing it to the suction main.

# Royal Visit to Sheffield

## Duke of Kent Inaugurates the World's Largest Spiral-Guided Holder

A high honour was paid to the Gas Industry, and particularly to the Sheffield Gas Company, when H.R.H. the Duke of Kent inaugurated, on Wednesday, June 29, a new gasholder which had been erected for the Company by Messrs. Newton Chambers & Co., Ltd.

Among those presented to the Duke, on his arrival by train in Sheffield, by Lord Riverdale, a Director of the Gas Company, were Lieut.-Colonel Sir Henry Stephenson, Bt., D.S.O., D.L., Chairman of the Company, Sir Samuel Roberts, Bt., Chairman of Newton Chambers, Mr. Ralph Halkett, General Manager and Secretary of the Gas Company, Mr. Ralph Halkett, Jnr., Assistant General Manager, and Mr. W. T. Kitching, General Manager of the ironworks of Newton Chambers.

### Welcome at the Works.

From the station the royal car was driven to the Wincobank Works of the Sheffield Gas Company, where the Duke was welcomed by Colonel Stephenson, who presented to him other Directors and employees of the Company and of Messrs. Newton Chambers. A large concourse, including many representative members of the Gas Industry, had assembled at the Works, and the Duke, with civic officials and the Directors, took his seat upon a simple platform which had been erected under the shadow of the big holder.

Sir HENRY STEPHENSON welcomed the Duke, and asked his acceptance of a memento consisting of a gold match case on which were engraved his name and an inscription commemorating the occasion.

The gasholder, Sir Henry told the Duke, was the largest of its type in the world and had been designed by a Sheffield firm and built by Sheffield men for the Company. He thought the Duke would agree that the contractors were to be congratulated on their success both for the workmanship it contained and for the fact that it had been completed in the specified time of 14 months.

Sir Henry referred briefly to the history of the Company up to the time when, in 1917, it changed its name to the Sheffield Gas Company, and in 1921 the old candle power standard was abolished and the 500 B.Th.U. standard adopted. As early as 1917, said Sir Henry, the Company commenced making contracts with coke oven undertakings for the utilization of waste coke oven gas. This was the prelude to the formation of the South Yorkshire Gas Grid, the phenomenal success of which was largely responsible for these purifiers and this large gasholder.

As some indication of the increased consumption due to the introduction of this cheap gas, he could say that their output had been doubled in the last 20 years—from 5,000 million cu.ft. per annum in 1918 to 10,000 million last year, and also that gas, previously blown to air from 14 coke oven undertakings, had been utilized for the benefit of the community in general, and the coal, coke, and steel industries in particular.

### Cheap and Reliable Fuel.

"We in Sheffield," continued Sir Henry, "look upon your Royal Highness's presence here with special gratification at a time when the industries of our city are playing such an important part in the carrying out of the rearmament programme."

These industries depended on their Company for a supply of cheap and reliable fuel for their furnaces, and by the utilization of the coke oven gas they were able to offer this at a cost which not only reduced the price of steel in the home market, but enabled the manufacturer to compete in markets throughout the world. It had been a matter of great satisfaction to his Company that the steel manufacturers of Sheffield had shown every desire to take advantage of this convenient and readily controlled fuel.

Sir Henry announced that, when the time came for painting the holder, it was the Company's intention to camouflage it to be as little conspicuous as possible from the air.

Sir SAMUEL ROBERTS, Chairman of Messrs. Newton Chambers, told the Duke of the exacting conditions under which the holder was constructed. No trouble or expense was spared to make it a success. In the first place they had to be satisfied as to foundations, and the colliery department co-operated with the ironworks. In spite of the fact that the holder was on solid whinmoor rock, the miners sank a shaft 28 ft. through the rock to determine that geological conditions were safe. During the erection they experienced one of the most severe winters of modern times and men were at work through severe snowstorms. They were able to do this owing to the welfare provisions of the ironworks General Manager, Major W. T. Kitching, which had been a most important factor in enabling work to continue 24 hours a day. To crown their difficulties they experienced the worst gales the country had known during the inflation tests.

Sir Samuel said his Company's relations with the Gas Company were most friendly, not only as regards the erection of the holder and purifiers, but through their subsidiary coking company which supplied the Gas Company with nearly enough coke oven gas to fill the great gasholder anew every day of the year.

**ORIGINALLY two Companies operated within the County Borough of Sheffield, and in 1844 became amalgamated under the title of the Sheffield United Gas Light Company. In 1850 the Town Council formed a Gas Consumers Company, and after applying for an Act of Incorporation in 1853, eventually amalgamated with the old company. The title of the Company was shortened in 1917 to the Sheffield Gas Company. Up to 1918 the whole of the gas supply was manufactured at the three works of the Company situated at Neepsend, Grimesthorpe, and Effingham Street. In 1927, the annual volume of gas supplied amounted to 4,954 million cu.ft. Coke oven gas was first acquired in 1918 from the Tinsley Park Colliery Company, Ltd. Since that time the Coke Oven Gas Grid has been formed by which means some nine coke oven plants now serve the Company in addition to four further plants supplying direct into the works of the Gas Undertaking. Under this system the volume of coke oven gas alone dispensed during the year 1937 amounted to over 9,937 million cu.ft. Since 1924, the following undertakings have been acquired by the Company—namely, Dronfield, Woodhouse, Elsecar, Matlock, Matlock Bath, Bakewell, Baslow, and Barnsley.**

| | |
|---|---|
| **Total area of supply** | **315 square miles** |
| **Coke oven gas limits** | **416 square miles** |
| **Total length of supply mains** | **1,233 miles** |
| **Length of coke oven gas mains** | **56 miles** |

### Pioneer Work of National Importance.

The South Yorkshire Gas Grid was a pioneer work which was originated and carried out by the Company under the able guidance of the General Manager, Mr. Ralph Halkett, and was of the greatest benefit to the South Yorkshire coal trade and the large industrial consumers of Sheffield.

Inaugurating the holder, the Duke said that its construction marked another important step in the life of the Company. He felt also that it would prove to be a far-reaching development in the use of gas for industrial purposes in Sheffield.

"During the last 30 years," he said, "the output of the Sheffield Gas Company has increased by 7,000 million cu.ft. I think this figure shows more clearly than any detailed history of the Company not only the enormous increase in the industrial use of gas in this district, but the admirable foresight of the Company in planning their production in such a way as to make this development possible. The district of Sheffield is unique in that it has the only gas grid in the country, and this grid is proving a great benefactor not only from the industrial point of view but also from that of public health."

There was no doubt that a wider use of smokeless fuel, such as gas, was playing a very important part in the improvement of national health. The question of smoke abatement was far too important and far-reaching to be dealt with in a few words, but he was sure that by their developments in the last few years the Sheffield Gas Company had made a material contribution to the elimination of the smoke evil.

### A Guard of Honour.

Following the opening ceremony, the Duke was conducted on a tour of inspection of the Works by Colonel Stephenson, Mr. Ralph Halkett, and Mr. Halkett, Jun., after which he inspected a contingent of 62 ex-Servicemen employees who formed a guard of honour under Mr. S. Davies, an ex-officer of the Seaforth Highlanders. Two of the men with whom the Duke chatted in

passing were Mr. Joseph Marsh, aged 75, of Burnaby Street, a fitter, who fought in the Egyptian campaign of 1882, and Mr. David Aiken, a gatekeeper and former member of the Royal Fusiliers.

The royal car, with its escort of civic and other cars, then left the Works for the Royal Victoria Station Hotel where luncheon was taken at the invitation of the Chairman and Directors of the Gas Company and of Messrs. Newton Chambers & Co., Ltd., Colonel Stephenson being in the Chair.

It may here be mentioned that the arrangements for the whole of the function, including the admirable luncheon later enjoyed by the guests, passed off with the greatest smoothness, and every possible consideration was given to the comfort of those who had been invited to pay their respects to the Royal visitor. The programme, and the carrying out of it, reflect the greatest credit upon Mr. Ralph Halkett, Jun., to whom had been entrusted the duty of making all the arrangements, the more so as the Duke had intended to fly to Sheffield and the fact that the weather prevented his doing so at the last moment put the start of the programme considerably behind time. Much of this was, however, regained without any apparent effort or dislocation.

## Luncheon.

Nearly 300 guests were entertained, the Lord Mayor of Sheffield, Alderman E. G. Rowlinson, J.P., being on the right of the Duke of Kent, and the Master Cutler, Colonel F. A. Neill, D.S.O., T.D., upon the left of Colonel Stephenson, who was in the Chair. Others at a distinguished top table included Lord Aberconway, Lord Riverdale, Sir Samuel Roberts, Lieut.-Colonel H. W. Woodall, and Mr. Ralph Halkett.

The DUKE OF KENT, proposing the toast of the City and Industries of Sheffield and District, reminded his audience that this was not his first visit to Sheffield. He had been several times, but this was the first time he had visited the works of the firms he was seeing that day.

"It is the first occasion I have had the pleasure of inspecting the works of our hosts at this luncheon," said the Duke. "I think this visit is remarkable, as it shows how wide is the range of industries carried out in this city. Although its range may appear very wide, it has as its basis one product that has become absolutely synonymous with Sheffield—steel. Among the many links in the chain of Empire development the one forged by Sheffield plays no small part. As well as the many advantages that are obtained by specializing in one product, there is one definite disadvantage, and that is that during a period of trade recession the whole industry will suffer.

"In Sheffield you have escaped this period of recession. You are among the few industrial centres that have turned the bad times into an undoubted asset. For this alone you deserve very sincere congratulations. You have thought that when things were slack and machinery idle it would be no loss to cut down production to the minimum and entirely convert your plant to the newest and most efficient processes. You have used the depression to make yourselves very up-to-date, and now you are justly reaping the rewards of this far-sighted policy.

"You have not only brought your plant and machinery up to date but have also spent time and money in industrial research. I think this is typical of the care and thoroughness with which you have undertaken all developments of the industry of this city. Without this, it would never have been possible to obtain the fullest advantages from the many discoveries which have been made during the last few years.

"I am not a chemist nor have I any extensive knowledge of the technicalities of the heavy industries, but since I first visited the factories a good many years ago I have seen an extraordinary

H.R.H. the Duke of Kent Performing the Inauguration Ceremony. On his left is Lt.-Col. Sir Henry Stephenson, Bt.

alteration in the methods of production—alterations which have shown obvious improvements. I think there are obvious advantages which I have experienced. I used to spend many hours in cleaning my golf clubs. Now I have the advantages of stainless steel. Among these new processes there is a remarkable control of temperature. In this very necessary thing our hosts to-day have played a very prominent part."

After replies by the Lord Mayor and the Master Cutler, the toast of the hosts was proposed by Lord Aberconway and enthusiastically received. Colonel Stephenson briefly responded, and the Duke departed on a tour of other Sheffield industrial enterprises.

The Duke Tours the Works with Sir Henry Stephenson, Bt. (Chairman of the Sheffield Company), Mr. Ralph Halkett (General Manager and Secretary), Sir Samuel Roberts, Bt. (Chairman of Newton Chambers & Co., Ltd.), and Mr. Ralph Halkett, Junr.

# The Sheffield Gas Company

**The story of the Sheffield Gas Company, especially in recent years, may be termed one of the romances of the Gas Industry. With the formation of the South Yorkshire Gas Grid, conceived and developed mainly by the foresight, energy, and enthusiasm of the General Manager, Mr. Ralph Halkett, progress has been phenomenal, as can be seen from the following brief account.**

The remarkable progress of gas in Sheffield is indicated by the fact that the total output has risen from 4,606,949,000 cu.ft. in 1918 to approximately 10,000 million cu.ft. in 1937. Seventy-five per cent. of this huge output is used for industrial heating purposes. Such an industrial load, obtained, maintained, and developed under exacting competition with cheap solid fuels, in an industry demanding the utmost value, has only been made possible by extensive co-ordination of cheap gas and efficient service.

The year 1931 marked the beginning of an important phase in the development of the Company, when Parliament, after a searching enquiry, granted powers for the formation of the South Yorkshire Gas Grid. This innovation was accepted with considerable scepticism in many quarters, but time has justified the foresight and imagination of the management. In 1918 the total output of gas was less than 5,000 million cu.ft. In 1937, it approximated 10,000 million cu.ft.—an increase of over 100% in the relatively short space of twenty years! This demonstrates conclusively that the South Yorkshire Gas Grid—the first and only one of its kind in this country—has proved an unqualified success. Prior to 1931, the greater part of the gas produced in the manufacture of coke was literally blown into the air—sheer waste. Nowadays that gas is purchased, purified, and distributed by the Sheffield Gas Company to the benefit of all consumers, industrial and domestic, within an area of 314 square miles. More than that, valuable residuals and by-products are extracted and put to profitable use. It is true to say that as a result of this enterprise the value of the materials produced from coal at the pit-head is nearly twenty times what it was twenty years ago. There are now 56 miles of mains laid down for the sole purpose of carrying coke oven gas to the Company's purifying plants. Previously reference has been made to the contrast between the gross annual output in 1918 compared with 1937. A sharper comparison is this: in 1918 the highest daily output was 22 million cu.ft.; in 1938 it has grown to the enormous figure of 40 millions. Another interesting fact is that one customer alone uses as much gas as the whole of a town the size of Blackpool or Middlesbrough or Salford! No other gas undertaking in the country has progressed to anything like this extent, and there is still plenty of room for further expansion.

## Thirty Years of Industrial Heating.

This necessarily brief survey of the creation and growth of the grid system of gas distribution can be concluded with the very definite statement that everyone concerned has benefited: the mining industry, the steel manufacturers, and the humblest household consumer. In recent years the use of gaseous fuels for steel-melting, re-heating, and heat treatment has developed tremendously, and town gas has been very much to the front. The Sheffield Gas Company has had a practical demonstration department during the whole of its thirty years' activities in industrial heating. This department has been equipped with gas-fired furnaces and equipment of a type essential to the local steel industry, which could be demonstrated under practical working conditions. Successful as this has been, it was deemed desirable—in fact, essential—that a Research Department be set up to support the activities of the Industrial Department. With the increased intricacy of the modern steel and metal industries, problems of correct heating and processing become more exacting every day, and the activities of a Research Department staffed by suitably trained technical men, having a thorough knowledge of metallurgy, and capable of working in conjunction with men of long practical experience in the use of gas for industrial heating, are undoubtedly of advantage.

The possibilities of increasing the use of gas for industrial purposes in the Sheffield area in the future must be considered in the light of present indications. It has become very apparent in the last few years that fuel in a gaseous form is preferred to any other source of heat for steel-heating purposes. Enlightened industrial users of fuel appreciate that town gas, even apart from its initial cost per therm, has other features which are a decided economic advantage. In Sheffield, gas is available for large scale consumption at initial costs which, on a thermal basis alone, are competitive with any other fuel.

## Progress in the Home.

So closely linked with industry is the service of the Sheffield Gas Company, it is sometimes forgotten what tremendous strides have been made in the domestic field. Since 1920 the number of consumers has increased from 106,000 to 184,000 in 1938. The Company's area of supply has grown from 167 square miles to 314 square miles in the same period. Length of mains has increased from 638 to 1,238 miles. In less than twenty years the sales of appliances for domestic purposes have increased by over 400%—and in spite of intense competition from other forms of automatic fuels. This progress is unabated. Sales of appliances in 1937 exceeded 1936 by over 55%. That the Company is vigorously fostering new developments in the use of gas in the home is proved by the almost sensational sales of water heaters. It is only in recent years that water heating has developed to a stage where it can be universally applied. The management were quick to sense the possibilities, and a great deal of hard pioneer work was put in hand. Progress was slow at first. Women were not easily converted from a lifetime's use of the old methods. But perseverance won in the end, and since Jan. 1 there has been an increase of over 124% in sales compared with the same period last year.

Faced with intense competition in a field which not long ago was confined to electricity, the sales of gas-operated refrigerators also have made rapid progress. The superiority of this appliance is evident by the Company's successful conclusion, last year, of the sale of 200 models for one big block of new flats. This was the largest order ever secured in the Provinces.

At various points in the Company's area showrooms are conveniently established for domestic consumers. There are eleven of these, the largest of course being the Chief Showrooms in High Street, Sheffield. The others are located in the Sheffield suburbs of Abbeydale, Hillsborough, and Broomhill, and at Woodhouse, Dronfield, Matlock, Matlock Bath, Bakewell, Hoyland, and Barnsley.

An increasing interest which the younger housewife takes in the efficient management of her home was the reason for the launching eighteen months ago of a new activity—the Home Service Bureau. This department operates on a very personal basis with women consumers. The qualified staff of demonstrators, in addition to giving free advice and assistance on cooking, includes within its scope kitchen planning, interior decoration, home management, &c. Already it has been responsible for the planning and design of many modern kitchens. During the last year over

12,000 women attended cookery lectures organized by the Bureau.

The all-round expansion of the Company's service has created inevitable problems of administration. For some time now office accommodation has become increasingly inadequate and the management embarked on a scheme to provide new premises to ease the situation. The building is now in course of construction and is designed on a modern but strictly functional basis. It has the clean lines appropriate to this age of the simple, direct message, and is the physical expression of the virility and awareness of the Gas Industry. Strange as it may seem it harmonizes perfectly with the present seventy-year-old building alongside which it is being erected—a striking tribute to the skill of the designer and the selective instinct of the management.

This, then, is the story of a remarkable enterprise culminating in the Royal patronage of a signal achievement—the erection of the mighty gasholder at Wincobank. As high as St. Paul's Cathedral stands this colossus, a monument to the enterprise of a great Public Utility Company which had its beginnings in a drab place called Shude Hill 120 years ago.

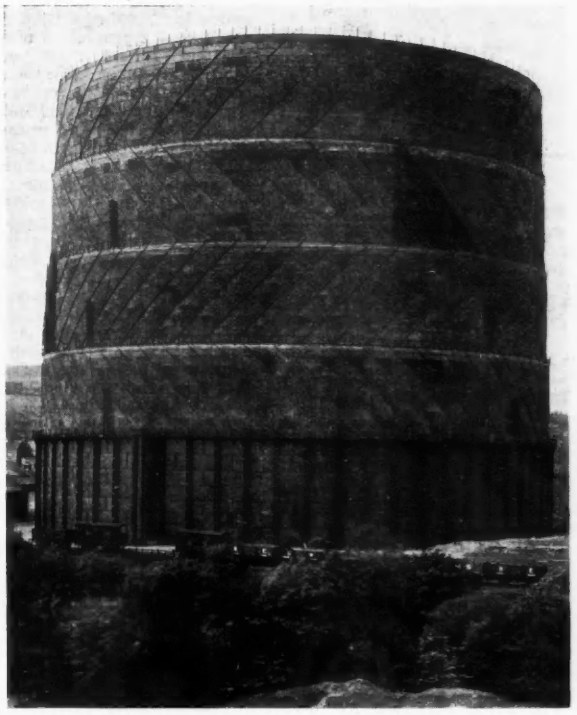
# A FEW FACTS CONCERNING

# The New Holder

The new Sheffield spiral-guided holder, of eight million cu.ft. capacity—the largest of its type in the world—was manufactured by Messrs. Newton Chambers & Co., Ltd., Thorncliffe Ironworks, near Sheffield.

Some of the difficulties with which the makers had to contend were referred to in the speech, at the inauguration, by Sir Samuel Roberts, Chairman of the Company (reported elsewhere in this issue). Other interesting facts are that the first sod was cut on June 30, 1936, and the foundations completed by Nov. 30 of the same year. The erection of the tank and holder was completed by Nov. 6, 1937, when it was inflated with air, tested, and finally purged ready for use on Jan. 21, 1938.

At the inauguration ceremony Sir Henry Stephenson paid high tribute to the Contractors, who had not only made an excellent job, but had completed it within the specified period of 14 months.



The following are the relevant data:

TOTAL WEIGHT of

| | Tons. |
|---|---|
| Concrete in foundation | 6,850 |
| Steel in foundation | 157 |
| Steel in tank | 2,111 |
| Steel in holder | 1,384 |
| Water in tank | 61,633 |

MEASUREMENTS.

| | Ft. |
|---|---|
| Diameter of tank | 250·00 |
| ,, inner lift | 237·75 |
| ,, second lift | 241·00 |
| ,, third lift | 244·25 |
| ,, outer lift | 247·50 |
| Depth of tank | 45·75 |
| ,, inner lift | 45·00 |
| ,, second lift | 45·00 |
| ,, third lift | 45·00 |
| ,, outer lift | 45·00 |

Size of inlet and outlet pipes, 36 in. dia.

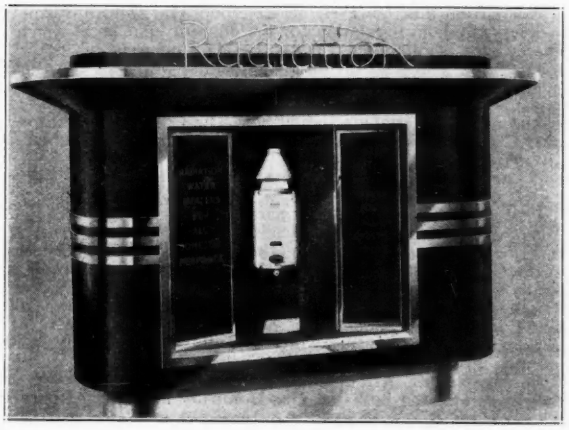
Total pressure when fully inflated, 12·7 in. W.G.

Total height of holder to centre of crown when fully inflated, 233·75 ft.

Ordnance level at the surface of the concrete foundation, 132·25 ft.

## Radiation Water Heater Display

## at the Glasgow Empire Exhibition




The above illustration shows the striking water heater display fitted by Radiation Limited in the Gas Pavilion at the Empire Exhibition, Glasgow. This display is constructed of blue stainless steel with polished fittings. The name "Radiation" above is in Neon lighting. The unique feature of the display is the revolving front. This is mechanically operated, and is arranged to exhibit various types of Radiation sink and multi-point heaters in turn. The heater shown is the No. 210 M. multi-point. The centre portion is flood-lit from above, the lighting being intermittent, blacking out as the display revolves—altogether a very effective exhibit, which is attracting a good deal of public attention to the water-heating load in which the Gas Industry is so vitally interested at the present time.

# Manchester Association

## VISIT THEIR

# President's Company

**The Manchester District Association of Gas Engineers met in Liverpool on Friday, July 1, when they visited the showrooms of the Liverpool Gas Company at Radiant House (described in the "JOURNAL" for Jan. 26), and were subsequently, by kind invitation of the Chairman and Directors of the Company, entertained at luncheon at the Adelphi Hotel. Later in the day they inspected the Garston Gas-Works of the Company, which will be described in a subsequent issue of the "JOURNAL."**

The members were welcomed by Sir Christopher Clayton, C.B.E., Ph.D., F.I.C., J.P. (Chairman of the Company), and by their President, Mr. E. Astbury, M.I.Mech.E., Chief Engineer to the Company.

At luncheon, Sir CHRISTOPHER CLAYTON proposed the toast of "The Manchester District Association of Gas Engineers." He said it was a great pleasure to the Directors of the Company and himself to offer a hearty welcome to the members of the Manchester District Association of Gas Engineers. This was their third visit to Liverpool, the first being in 1907, when the late Mr. Edward Allen was Engineer, and again in 1923, the year when the late Mr. R. E. Gibson was President.

After some reference to the history of the Association, Sir Christopher said that year by year sales of gas in the North were increasing, and it was no mean task to increase those sales, when every new appliance which was invented was designed to use less gas and to work with greater efficiency than its predecessor. A very important duty was to see that the gas fitters were kept up-to-date with regard to new appliances so that they were installed correctly and the users obtained all the advantages to which they were entitled. They had in their Company instruction classes for their fitters, and he was glad to know that those classes were greatly appreciated by the fitters, and the results were proving very satisfactory. A new departure, and an important one, was the use of gas in industry, and gas undertakings around Liverpool were members of the Industrial Gas Development Centre which had its headquarters in Duke Street. He hoped the visitors, who no doubt had seen the exhibits in the basement at Radiant House, would also visit the Duke Street Showroom, which had a more complete display. The Engineering and Commercial Departments were working very closely together, and they had every reason to be satisfied with the results obtained. Central heating with thermostatic control was also making great progress.

However, the aim of every engineer was to obtain the best results from each ton of coal—both of gas and by-products—and here the engineer and chemist must work together. Important work in the field of research lay ahead of them, and he could not do better than quote a passage from the Presidential Address given by Mr. H. C. Smith, in London, the previous month, when he said, "I believe we have still much to learn with regard to the processing of coal, the working up of by-products, and the utilization of gas, and that more fundamental or long-distance research, properly directed and carried out on a sufficiently large scale, would ultimately pay a handsome dividend." One could not too often stress the enormous value of this side of the work which was being carried out by The Institution of Gas Engineers—whose President, Mr. Robertson, they were delighted to have with them that day—and its affiliated Associations. The present strong position of this country to-day had been built up on its coal resources, and he submitted that the most economical manner of using coal was to convert it to gas.

The PRESIDENT expressed the thanks of the Association to the Chairman of the Company for the very kind references he had made to the Association. The importance of the Manchester and District Association was reflected in the fact that at the present time two of its members were the Vice-Presidents of The Institution of Gas Engineers. Mr. George Dixon, of Nottingham, who, by the way, was a Liverpool man, born and educated in Liverpool, took his degree in Engineering at the local University, and received his training on Merseyside. Sir Frederick West, of Manchester, was well known to them all, and it gave them great pleasure to know that the valuable work he had done for the Industry had been recognized. They were delighted to have them that day and to offer them their heartiest congratulations and good wishes.

The foresight of the late Mr. Thomas Newbigging and the small company of Gas Engineers who founded the Association was never more evident than to-day, and it should be noted that it was followed by similar associations in other parts of Great Britain. The need for such a body was never greater than to-day, when they had so many difficulties to overcome. The effect of the Coal Bill had been to raise the price of coal considerably to public utility undertakings. This increase in price had a cumulative effect which was bound to have far-reaching results. Gas undertakings could not carry the whole burden of something like 25 to 30% advance in the cost of coal. The present attempt of coal-selling schemes to fix one price for all coals, irrespective of quality, was an injustice which could not continue. It would be necessary, therefore, to come to an arrangement fair to both buyer and seller. Failing this, it was very evident that the Coal Industry would find a proportion of its customers turning to the use of oil and other fuels.

Sir Christopher had made special reference to the necessity for research. This was appreciated by all engineers, and indeed by all members of the Gas Industry, and their motto must be "Research, and still more research." There was a great amount of work which must be undertaken if gas was to continue to hold its premier position as a fuel. The Research Committees of The Institution of Gas Engineers were already doing valuable work, and they had the valuable co-operation of those large undertakings which maintained separate Research Departments. And to the manufacturers of plant and appliances he paid tribute for their ready co-operation with engineers.

He was sometimes asked his opinion as to the future of gas. He could say, with confidence, that in spite of the competition, often unfair competition, which they had to meet and the difficulties to be overcome, viewing the great progress made during the past ten years, and with such organizations as The Institution of Gas Engineers, the B.C.G.A., and the Society of British Gas Industries, and the highly trained staffs engaged on the works and in the laboratory, the great increases in efficiency in both domestic and industrial appliances, the Industry would continue to progress.

In conclusion, he would like to express his thanks and gratitude for the manner in which he had been supported by the Chairman and Directors of the Liverpool Gas Company.

### The Liverpool Company.

The toast of "The Liverpool Gas Company" was proposed by Mr. R. ROBERTSON, Chief Engineer to the Bristol Gas Company, and President of The Institution of Gas Engineers. In doing so he said that the Liverpool Undertaking was the sixth largest in the United Kingdom, and as such its operations were on a grand scale. It ministered to the comfort, convenience, and well-being of a quarter of a million homes. It provided a safe investment for 3½ million pounds of Liverpool's savings acquired in more precarious ways. It provided over 3,000 wage earners with employment. It contributed to the amenities of Liverpool directly in providing means for the making of dustless roads and smokeless skies, while, indirectly, all the other city services benefited, since the Liverpool Gas Company was one of its largest ratepayers. Nor were the material benefits it conferred confined to Liverpool, for since its contributions to the National Funds of the Gas Industry were on an output basis, all other smaller undertakings benefited—a fact of which they were duly appreciative.

Apart from this, however, the Liverpool Gas Company enjoyed a deservedly high reputation for the efficient manner in which its affairs were administered. It had been fortunate in having had a long line of able and far-seeing Directors, who had consistently pursued a policy at once sound and progressive, with the result that to-day the Liverpool Gas Company was a model of what a public utility undertaking should be. The Chairman, Sir Christopher Clayton, followed a succession of able Chairmen, and he had given freely to the Gas Industry of his wide business experience and knowledge. He had served with distinction as a member of Parliament and also in many other capacities.

Liverpool had also been fortunate in having had a succession of exceptionally able executive officials. For three-quarters of a century there was no name better known or more highly esteemed in the Gas Industry than that of King. Three generations of this family were succeeded by Mr. Edward Allen, who was President of The Institution of Gas Engineers in 1914 and one of the leading Gas Engineers of his day. Mr. Allen was followed by Mr. R. E. Gibson, a man of sterling worth and outstanding ability, whose untimely death they all deplored.

Happily, in Mr. Astbury, the succession had been assured, and they congratulated both the Gas Company and Mr. Astbury on

his appointment to succeed Mr. Gibson and wished him every success in carrying out the traditions of the past, and in this he would be ably supported by the Secretary and Treasurer, Mr. Sandon Stubbs.

Another of the characteristics of the Liverpool Gas Company was its readiness to extend hospitality and place its experience at the disposal of its neighbours and of the Gas Industry generally. There were few, if any, present upon that occasion who had not benefited in this way in their individual capacity, and, collectively, they had often enjoyed their bounty on a scale which few undertakings could emulate.

He had, personally, very happy recollections of the successful Summer Meeting of the Institution in 1933, under Mr. Gibson's Presidency, when everything possible was done to make the visit a profitable and pleasant one. To-day, once again, the Industry, as represented by the Manchester District Association of Gas Engineers, was enjoying Liverpool's hospitality, and, on their behalf, he would return heartiest thanks. They were also grateful for the opportunities afforded them of obtaining further information at first hand about the many interesting matters Mr. Astbury discoursed upon in his recent Presidential Address.

Mr. E. B. ROYDEN, J.P. (a Director of the Liverpool Gas Company), responded to the toast. Referring to the early history of the Liverpool Company he observed that many were the vicissitudes of this first venture. An opposition Company was started in 1822, but in 1848 they became absorbed by the original Company. New offices were built in Newington and remained the headquarters until 1870. Upon the building of the Central Station the Cheshire Lines Railway Committee provided new, handsome premises in Duke Street as the head office of the Company. Radiant House had now superseded Duke Street which was being re-built in part, and its one-time domestic showrooms now housed a magnificent display of commercial and industrial apparatus. To-day, the Company played a leading part in the civic life of Liverpool and its environs by pursuing a progressive policy. Every new invention or process was carefully examined as to its value as a domestic or industrial appliance, and the Research Laboratories at Duke Street were engaged in the testing of all apparatus sold.

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After making a tour of the Garston Works tea was provided in the Company's Club Room.

Mr. T. R. COOK (Blackpool) proposed a hearty vote of thanks to the Chairman and Directors and to Mr. E. Astbury for their kindness in arranging the visit and their hospitality. Mr. W. H. T. JOHNS (Rotherham) seconded.

Mr. ASTBURY said he was delighted to see among those present a number of the students who had attended his classes at the Liverpool Technical College when he was Lecturer there, and a considerable number of them were now occupying important positions in the Industry. In conclusion, he would like to state that he was now entering upon his 35th year of service with the Company, and he desired to express his sincere and heartfelt thanks to the Chairman and Directors and all the members of the staff for the support and goodwill they had always shown to him. He would have much pleasure in conveying the thanks of the members of the Association to them all.

# London and Southern Juniors' Summer Outing to Kentish Coast

**A day of outstanding interest and enjoyment was spent by members of the London and Southern District Junior Gas Association on June 25, when, accompanied by their ladies, they were the guests of the Folkestone Gas and Coke Company—the occasion being their Annual Summer Visit.**

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The members, with the President, Mr. R. N. LeFevre, and Mrs. LeFevre forgathered at Shorncliffe Station, where Mr. G. le B. Diamond (Engineer and Manager of the Folkestone Gas and Coke Company) was there to meet them. After an inspection of the beautiful Kingsnorth Gardens (which, it will be recalled, were floodlighted by gas during the A.P.L.E. Conference last year and were the subject of very favourable comment), the remainder of the morning was devoted to a motor coach trip through the neighbouring country, including Sandgate and Hythe, the various items of interest *en route* being pointed out.

The party were subsequently entertained at luncheon at the Hotel Metropole—Mr. G. M. GILL, M.I.Mech.E., a Director of the Folkestone Company, presiding, when a charming bouquet was presented to Mrs. LeFevre.

The Loyal Toast having been duly honoured, Mr. GILL rose to propose "The London and Southern District Junior Gas Association," and at the outset offered a very warm welcome to the Association and hoped they would have a pleasant visit. Their Association, he said, had made a great name for itself; the quality of the Papers read before it was always very high, and the work done by the Association had made its mark in the Industry. Mr. Gill said he would take this opportunity of offering a prize of five guineas for the best technical communication of the year by a member of the Association—be it in the form of a Paper, a contribution to a discussion, or a letter or article in the Technical Press. The details of the offer would be discussed with the Council in due course. After a further assurance of the Company's pleasure at their presence, Mr. Gill offered the toast of the Association coupled with the name of their President.

Mr. LEFEVRE, in reply, said they were all very grateful to Mr. Gill for the kind things he had said about the Association and for the generous offer he had just made. On behalf of the whole Association, he would express their sincere appreciation of the offer of this award. Mr. LeFevre said he would take the opportunity also of thanking Mr. Diamond for all he had done in connexion with that visit. Indeed, they were grateful to the Directors of the Company and to Mr. Gill and Mr. Diamond in particular for the excellent time they had given them that morning and for their hospitality. He asked those present to drink the health of the Folkestone Gas and Coke Company, coupled with the names of those two gentlemen.

The toast was cordially accepted, and, in reply, Mr. DIAMOND thanked Mr. LeFevre for the extremely kind things he had said. He wished to mention by name one or two of their distinguished guests on that occasion, and to say how much they welcomed them. They would be particularly glad to join in welcoming Mr. Hutchinson, who was at one time Deputy-Engineer at Beckton; also Dr. Griffiths, and Mr. Slaughter and Mr. Sherriff, of the Technical Press, as well as all the ladies. They had many visitors to Folkestone, said Mr. Diamond, but there was none they were so glad to welcome as this Association—because they recognized in the Junior Associations the people who were carrying the Industry along on their backs; they were the people who were doing the work, and he wished to pay honour to those Associations for the work they were doing behind the scenes. He wished also to honour the President, Mr. LeFevre, who by great ability and force of character had built up a position for himself which was going to be enduring. They were going to see him, said Mr. Diamond, in a position of high importance in the Industry in the future. Mr. LeFevre had done an enormous amount of work on behalf of technical and practical education in the Industry—and he had not yet received all the credit that was due to him. Mr. Diamond concluded with an anecdote which greatly appealed to the listeners. On the occasion of the visit of that august body, The Institution of Gas Engineers, to Folkestone last year, when their special train drew in, Mr. Diamond overheard one porter ask another: "What is this affair?" "Oh," said the other, "it's the gasfitters' outing!"

The proceedings closed with a toast to the Chairman, which was proposed by Mr. S. C. WALDOCK (Senior Vice-President) and duly acknowledged by Mr. GILL.

## A Visit to Dover.

In the afternoon the members were conveyed to Dover, where they had the opportunity of inspecting either the Castle or the Southern Railway's new train ferry dock, gathering again afterwards at the Lord Warden Hotel for tea.

### The Castle.

Renowned throughout the ages for the part it has played in English history, Dover Castle, stern yet picturesque, still dominates the Channel and surrounding district and is, indeed, in an

excellent state of preservation. In 1181 was begun the largest of all tower-keeps and the fourth largest keep in the country—the great tower of Dover. This castle is unique in that it shows combined the two features of the tower-keep and the towered curtain walls which displaced the great towers. The enormous keep of Dover has walls in some places more than 20 ft. thick. It has a basement, a first floor, and a floor above that which is the entrance floor, while the entrance stair is very elaborate. The tower at the angle has a little oratory approached from the quarter-landing of the great stair, while above is a really beautiful little Norman chapel—all constructed over the lower part of this immense "fore-building."

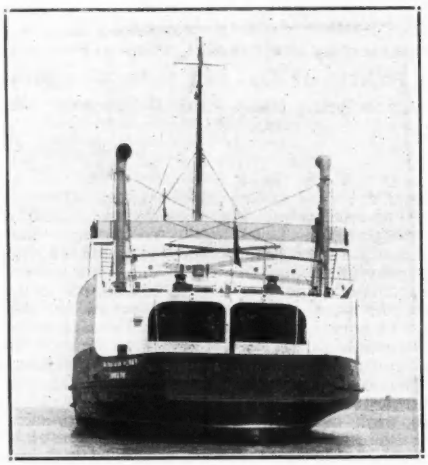
The great tower was never finished—either owing to the death of Henry II. or because it was realized that it was just a huge "white elephant." We cannot tell whether the present upper floor was intended to be the main story, but it seems improbable, as the cross-wall is unpierced with the arches one might have expected if such were to have been the case. The general proportions of the tower suggest that the main floor was to have been added above the entrance story, in which case Dover keep would have been one of the grandest towers in the world.

The ante-rooms, with their fine Tudor fireplaces, the galleries, vaults, and roofwork were all viewed with great interest, including the very complete water system which was built into the walls evidently during construction, the pipes of which are as good to-day as when they were put in in the twelfth century. There is also a well some 400 ft. deep. No fewer than 27 chambers were built into the massive walls, and even to-day fresh chambers are being discovered which had been entirely filled in at some period or another. The arches within the keep are very interesting, as they are of the depressed segmental type instead of the usual Norman semi-circular shape. Around the keep are an inner and outer line of ramparts and twenty-one towers, belonging to the twelfth and thirteenth centuries.

Close to the keep are the Roman Pharos and the church of St. Mary. The former, which dates back to the year A.D. 50, was used as a lighthouse or watch tower. The church—one of the oldest in the country—though rather indifferently restored in 1860, contains some fine central arches embodying Roman tiles.

### The Train Ferry.

Through the courtesy of the Southern Railway, special permission was granted to view the train ferry dock and ancillary



Stern View of the Train Ferry seen at Dover.

equipment which have been built adjacent to Dover Marine Station. Fascinating as the story is, we cannot tell here of the engineering feats achieved in the construction of this 414 ft. by 70 ft. dock, with all its accompanying machinery, or of the many weary months spent working beneath the surface of the water to complete the facilities which enable one to go to sleep in the train at Victoria at 10 p.m. and wake up in Paris 11 hours later without having left one's berth.

By reason of the variation in tide levels, the dock had, of course, to be enclosed, and this is achieved by two gates of the box or flap-door type, each weighing 300 tons, which work independently of each other on horizontal hinges laid below the dock sill—in other words, they are lowered away from each other until they lie flat under the water on specially prepared rest blocks. When the ferry boat has passed backwards into the dock—a very delicate operation, as there is none too much room to spare—the gates are pulled up again, and the berthing master notes the water level within the dock and also the amount of water the ferry boat is drawing. Given these two factors a formula quickly gives the exact difference in levels between the rails at the end of the boat and the bridge carrying the rails on the land side. This information is transmitted to the officer in charge of the pumping station, who can translate it into terms of gallons of water required to correct the levels. There are three sets of vertical spindle centrifugal pumps, each of a capacity of 230 h.p., and capable together of dealing with a maximum of 130,000 gallons of water a minute. The pump house control panel is a wonderful piece of apparatus, complete with a multiplicity of recorders and gauges showing the output of the pumps and the dock water level in relation to the sea level. The pumps themselves are situated well below the lowest water level to secure the greatest efficiency, which involved constructing the pump chamber 102 ft. long by 40 ft. wide with the lowest floor 40 ft. below high water level—and here again an engineering feat of no mean order was successfully accomplished.

When the ferry is safely in the dock and the water level adjusted to that of the adjoining railway track, the hinged bridge carrying the latter is slowly lowered until a slot in the under side exactly coincides with a vertical pin on the stern of the ferry. Not until this perfect contact has been established can the electrical interlocking device be released to permit of the operation of the signals in the railway control cabin and thus admit of vehicular movement on and off the ferry. The connecting bridge, which is 70 ft. long, is normally approximately level, but as loading and unloading of trains takes place there is naturally some tilting both longitudinally and laterally of the vessel. The bridge, however, being of completely articulated structure, takes up this difference.

There are at the moment three ferries on the Dover-Dunkerque service, having a length of 359 ft. and a beam of 63 ft. 9 in., with a mean laden draught of 12 ft. 6 in. They are designed for a speed of 16½ knots and contain four railway tracks capable of accommodating twelve coaches or 40 wagons. The after part of the train deck and a special covered upper deck are available for motor cars. The vessels are fully equipped for carrying first and second class passengers in the ordinary way as well as in the train sleeping cars, the accommodation including saloons, restaurants, smoke rooms, and bar, together with private cabins. The whole of the dock works was carried out to the design and under the supervision of Mr. George Ellson, the Southern Railway Company's Chief Engineer.

A thorough inspection of the dock, pump chamber, and bridge control room and signal box was made by the visitors, and after tea those who did not have to catch the train back to London returned to await the arrival of the ferry from the Continent, and were thereby enabled to watch the whole operation of berthing carried through from start to finish. Through the kind offices of the berthing master, the members were enabled to go over the whole vessel—train deck, engine-room, stokehold, cabin accommodation, and bridge, and also watch the railway vehicles being dealt with. In conclusion, it is fitting to pay tribute to the extreme kindness and courtesy of all the railway officials, who went out of their way to explain everything down to the smallest detail to the visitors.

## Athletic and Social

### Nottingham Snooker Successes.

The Nottingham Gas Department snooker team has won the Geo. Dixon Cup in the Municipal Institutes Association Snooker League. The cup and replicas were presented to the winning players at a supper at Hazelford Ferry on June 27. The trophies were presented by Mr. George Dixon himself, the Nottingham Gas Engineer.

### Rochester Outing.

Travelling by special train, about 800 employees of the Rochester, Chatham, and Gillingham Gas Company with their wives and friends enjoyed an outing to Margate on June 25. They were joined there by Alderman I. Granville Winch (Deputy-Mayor of Rochester and a Director of the Company) and Mrs. Winch, Mr. C. Valon Bennett, Engineer, General Manager, and Secretary, and other officials of the Company.

### Dougall's Employees' Outing.

On Saturday, June 25, a party of 50 members of the staff of Dougall's Gas Meters, Ltd., visited Ramsgate for their Employees' Outing. The party were entertained at luncheon by the firm, Mr. R. V. Steed (Managing Director) presiding. The toast of "The Firm and Directors" was proposed by Mr. R. Paramor and responded to by the Chairman. "The Visitors" was proposed by Mr. H. Telford and duly acknowledged by Major A. Goodall and Mr. E. R. Mudd, while "The Stewards" was proposed by Mr. J. Wood, and Mr. F. Yate replied. The party were subsequently entertained at tea by Mr. Steed.

# Scottish Junior Gas Association (Eastern District)

## Annual Outing

Members of the Association Assembled at Perth.

The Annual Outing of the Scottish Junior Gas Association (Eastern District) took place on Saturday, June 11, at Perth. The party of fully fifty members and lady friends were welcomed by the President, Mr. A. C. Rea, and Mrs. Rea.

The ladies proceeded by 'bus to Messrs. John Shields' Linen Factory, where a most enjoyable hour was spent. They then proceeded to the new Municipal Swimming Baths, which is claimed to be one of the most modern in the country, and were shown round by the Baths Superintendent. The members then proceeded to the Gas-Works where they were conducted round by Mr. Rea and members of his staff.

Both parties met again at the Salutation Hotel where they were the guests of the Corporation at lunch.

Bailie Sievewright, supported by a number of his colleagues, presided. He welcomed the Juniors on behalf of the Lord Provost, Magistrates, and Councillors of the City, and apologized for the absence of the Provost, who was unable to be present.

They were very glad to have the Juniors at Perth and looked to the Association and its fellows to provide the Engineers of the future. He hoped they had had an interesting and instructive visit to the Gas-Works at Friarton that morning. They had in Mr. Rea a first-class Engineer and Manager, and when the additions to the works plant had been made they would have a first-class Gas-Works.

Ex-Bailie Gowans (Convener of the Gas Department) associated himself with the welcome. In Perth they put gas in the forefront for industrial use and large-scale heating. Their new baths used gas heating throughout and the Municipal Buildings were equipped with gas-fired central heating boilers. They were trying to introduce central heating by gas to the schools also. The Gas Industry was coming into its own and, with the help of the technical education now available and Junior Associations such as this, it should keep going ahead.

The President, replying on behalf of the Association, said they had had a very pleasant morning and looked forward to an enjoyable motor drive in the afternoon. In Perth they were still making progress in the use of gas, an increase in output of over 3% had been shown last year, and they considered they were doing reasonably well. They were always on the lookout for new business and hoped to extend the central heating load and find new industrial outlets for their product. On behalf of the Association he asked Bailie Sievewright to convey to the Lord Provost, Magistrates, and Councillors of the City their sincere thanks for the hospitality extended.

After lunch the party enjoyed a motor drive by way of Dunkeld, Amulree, and the Sma' Glen—short stops being made at some of the beauty spots *en route*.

On returning to Perth, tea was served at York House, when Mr. Blackhall, on behalf of the members and friends, proposed a vote of thanks to Mr. and Mrs. Rea.

# Gas Undertakings' Results

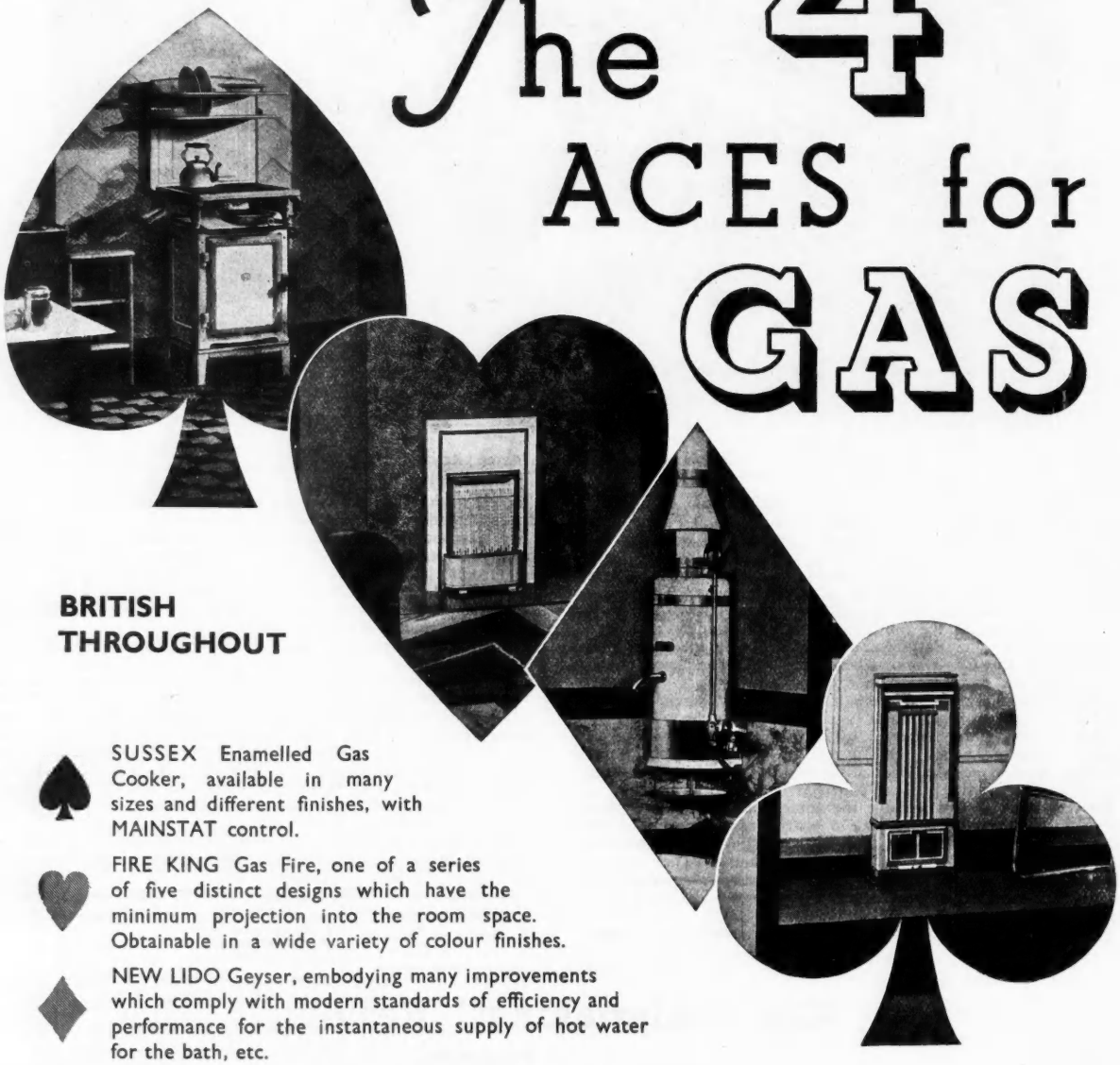
## Blackburn.

Just over 60 years ago the undertaking of the Blackburn Gas Light Company was purchased by the Corporation at a total cost of £656,731. In 1900 new works were opened at Greenbank. By March 31 last the capital expenditure had amounted to £1,175,267, though the amount outstanding at that date was no more than £446,099. Against this figure the sum of £205,847 was in the Loans Funds, the net debt outstanding amounting to £240,252. In the financial year ended at March, 1938, the total quantity of gas made, at 1,037,948,000 cu.ft., showed a decrease of practically 2½% when compared with the preceding year. Of this total, prepayment meter users took 42·27%, ordinary consumers 32·75%, and industrial users 7·99%. During the year the total number of meters in use increased by some 300, but under each of the three heads named there was a small reduction in the average consumption per consumer. There has been a satisfactory increase in the value of appliance sales through the showrooms, but on this subject the Borough Treasurer points out that the amount outstanding in respect of cookers and other fittings sold under hire-purchase agreements now amounts to £64,966, an increase of £10,095 in the year, and he urges again that consideration should be given to his remarks of last year on the necessity for the creation of a Reserve Fund.

## Brighouse.

The congratulations of the Brighouse Corporation were recently extended to their Gas Engineer and Manager, Mr. J. Corrigan, and his staff for the results of a very successful year's working. The report for the year ending March 31, 1938, shows the make of gas has increased from 249,060,000 to 253,038,000 cu.ft. The sales of gas have increased by approximately 9 million cu.ft. over the preceding year. The average price received per 1,000 cu.ft. of gas sold was 27·21d. During the year the gas undertaking of the late Hipperholme U.D.C. operating in the Bailiffe Bridge area was taken over by the Brighouse Gas Department, the gas, however, being supplied in bulk, under agreement, by the Halifax Gas Department. The amount of gas sold in this area amounted to 8,167,000 cu.ft. The agreement for bulk supply is now terminated, and gas is now supplied from the Brighouse Works. Further success has been achieved in the industrial field. The contract for the supply of a large quantity of gas for wire patenting furnace has been entered into, and the firm in question have now recommenced the gas annealing furnace. This is to be followed up by the erection of new galvanizing baths, and an ultimate load of over 30 million cu.ft. is anticipated from this source. In the domestic field the consumption per consumer both for ordinary and prepayment consumers shows an increase, due mainly to the

# The 4 ACES for GAS



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operation of the block rate system which offers gas at the low rate for domestic purposes of 3½d. per therm. The Department has also been successful in securing many street lighting improvement schemes in face of competition from the local Electrical Department and from private Electrical Companies. During the year improvements and additions were sanctioned to 150 lighting positions. The Gas Department has now the supervision of the whole of the lighting of the newly extended Borough, and the total number of lamps in operation in the Brighouse area is now 1,680 gas lamps and 17 electric lamps. For the size of the Borough Brighouse has perhaps a higher percentage of gas lamps than any other Borough in the country. The financial position of the Undertaking is remarkably healthy. The improvements and extensions at the Works and new Showrooms have all been provided for out of revenue or Appropriation Fund balance. The net outstanding debt on the Undertaking is only £6,895, with a reserve fund and appropriation fund balance of nearly £18,000. The net profit on the year amounted to £303.

## Buckhaven and Leven.

A report by Mr. H. A. Aitken, Engineer and Manager of the Buckhaven and Leven Gas-Works, states that the output for the past year has been 156 million cu.ft. as against 82 million cu.ft. when the Leven and Wemyss Gas-Works were acquired in 1921. Prepayment meters recorded 130 million cu.ft. compared with 51 million cu.ft. in 1921, while leakages were 8,500,000 cu.ft. as against 14,500 000 cu.ft. During the intervening years the price of gas had steadily fallen and was now 3s. 5d. per 1,000 cu.ft., with a likelihood of a further reduction next month.

## Coventry.

The financial year to March 31, 1938, was a very good one for the City of Coventry Gas Department, whose accounts show a balance transferred to Net Revenue Account amounting to £158,592, which compares with £135,638 for the twelve months immediately preceding. Prosperous industrial conditions in the city are indicated by the fact that the quantity of gas sold was 2,850,771,000 cu.ft. in the past twelve months, as against 2,588,260,000 cu.ft. in the year before, while the net profit has been just about doubled, at £32,180. As has been the custom for some years past, this net profit has been carried to capital account. The last occasion upon which any sum was appropriated in aid of rates was in 1924, when £15,000 was so utilized. The capital employed in the undertaking is £1,721,453, or at the rate of 12s. 1d. per 1,000 cu.ft. of gas sold; the loan debt at the date of the accounts standing at £729,632, or at the rate of 5s. 1d. per 1,000 cu.ft. of gas sold. The average price of gas sold during the year works out at just over 3s. per 1,000 cu.ft., or 7·56d. per therm. Of 71,217 meters in use, no fewer than 58,209 are prepayment. The amount spent on gas for public lighting in Coventry is on the up-grade, at more than £22,000. For the past year the net proceeds of residuals calculated on the cost of coal and oil amounted to 64·14%. A little less than one-sixth of the total quantity of gas made was carburetted water gas.

## Darwen.

The working during the past financial year of the Borough of Darwen Gas Department has resulted in a net profit of £4,304. The cost of coal to the undertaking during the year amounted to £12,070, or £1,148 more than for the preceding year, and £1,930 over 1936. The gas sent out from the works, at 198,623 000 cu.ft., shows an increase of 8,624,000 cu.ft., or 4½%. In spite of the increased quantity sold, the receipts for gas are somewhat less than a year ago, consequent upon the extended advantage being taken by the larger domestic and industrial consumers of the attractive low prices and two-part tariff rates offered. With regard to residuals, the report states that the market continues firm, "tar being disposed of through the Lancashire Co-operative Tar Scheme, and coke was not advanced commensurate with the price which could have been obtained." Sales of appliances through the showroom and on the district continue to increase; the record figure of £7,062 for the year having been reached. Of the increase of 8½ million cu.ft. in the quantity of gas sent out, more than 7 millions were taken by ordinary consumers. This brought the percentage consumed through ordinary meters up to 58·20. At the same time the quantity consumed through prepayment meters fell from 25·17% to 23·34%. Of the total output of 198,623,000 cu.ft., it is stated that 121,833,000 cu.ft. were consumed in the six months October to March.

## Guernsey.

During the year ended March 31, 1938, the Guernsey Gas Light Company, Ltd., decided to issue 2,000 of the unissued £10 shares and, as a matter of expediency, the Directors resolved to restrict the issue to resident shareholders and gas consumers. The issue was at par, and was very considerably over-subscribed. Having regard to the greatly increased demand for gas, and to enable the Company to continue the extension of mains in various districts, further capital was needed. The sale of gas during the twelve months, at 244,480,100 cu.ft., was 7,314,000 cu.ft. more than in the preceding year, while the number of consumers increased by 459, making the total 9,075. The Directors say that, but for the extremely mild winter, the gas sales would have been much higher. The dividend for the year is 4½%. This will leave a balance of £18,961, which, having regard to the fact that coal prices will be greatly increased this year, the Directors have decided to carry forward.

## Holyhead and North Wales.

The Holyhead and North Wales Gas and Water Corporation, Ltd., which controls eight undertakings—one of them (Llanberis) being gas and water—reports a net profit of £4,674 for the year ended March 31, 1938, and the dividend for the year is 5%. In addition to this, the sum of £1,000 is transferred from profit and loss account to the Reserve Fund. Receipts from gas are £700 up, at £29,747, and the gross profit is about £100 more than a year ago. There is a debit on Capital Account of £15,355. The undertakings controlled by the Corporation are those at Holyhead, Llangefni, Menai Bridge, Pwllheli, Llanberis, Llanfairfechan, Penmaenmawr, and Llanrwst. The quantity of gas sold during the year was 97,746,800 cu.ft.

## Kilsyth.

In the Annual Report of the Engineer and Manager of the Kilsyth Corporation Gas Department, it is stated that despite the advance in the expenditure on coal of £441, the price of gas for domestic purposes is to remain at 7½d. per therm. The year's trading shows a surplus of £825, while the quantity of gas consumed for the year shows an increase of 10,355 therms, compared with that of the previous year.

## Leeds.

The Gas Committee are able to report to the Leeds City Council an increase of 2·34% in the quantity of gas sold during the past financial year; the estimated total being 3,128,789,000 cu.ft., as compared with 3,057,348,000 cu.ft. in the twelve months ended March, 1937. Central heating accounts for 84,080,000 cu.ft. The net cost of gas into holder comes out at 11·77d. per 1,000 cu.ft., representing a decrease of 0·37d. when compared with the cost in the preceding year. While the capital expenditure on the undertaking has amounted to nearly £3,000,000, the net debt at March 31, 1938, was no more than £577,000. There are in use 60,730 ordinary meters and 93,790 prepayment. These numbers are more than a year ago by 762 and 1,464 respectively, or a total increase of 2,226. There are now 181 central heating installations using gas-fired boilers. Considerable developments have taken place in the use of gas for the engineering and allied trades, particularly in connexion with the manufacture of aeroplane parts. Continued progress is also being made in the gas firing of large-scale kitchens, and the new Queen's Hotel is entirely equipped with gas appliances for cooking and water heating, the gas consumption being very satisfactory. It is stated in the report that the oil-filming method of preventing gasholder corrosion is proving very satisfactory, and has been continued during the year. The total number of lamps in the city is 22,437, of which 20,760 are gas. Economies have again been effected in the use of gas mantles, the average number used per nozzle over the last five years having been reduced from 2·63 in 1934 to 1·94 in 1938. The accounts show a surplus on the year's working of £27,345.

## Lockerbie.

Gas made at Lockerbie during the past twelve months totalled 17,104,900 cu.ft.—a decrease of 104,300 cu.ft. compared with the previous year. Coal used totalled 1,529 tons—a decrease of 30 tons, the average make per ton being 11,186 cu.ft. against 11,038—an increase of 148 cu.ft. Coke revenue was £882—an increase of £7, and for dehydrated tar £344—an increase of £40—with showroom sales at £393—a decrease of £205.

## Macclesfield.

The Macclesfield Corporation Gas Undertaking made a net profit on the past year of £1,514 after appropriate transfers to reserve funds and provisions for income-tax, &c. The Gas Committee have decided not to alter the scale of charges for the next twelve months, but during the second summer quarter to reduce the rebate from 50% to 33⅓% consequent on substantial increases in the price of materials, particularly coal.

## Richmond (Yorks.).

The gas accounts of Richmond (Yorks.) Corporation for the year ended March 31, 1938, have been published by the Borough Treasurer, and show a net loss of £250, due largely to the expenditure of £200 in re-setting retorts. The department spent approximately £500 more during the year for coal, due to the increased prices. It is hoped by reducing the discount and non-recurring expenditure to turn this loss into a small profit.

# REFRACTORIES

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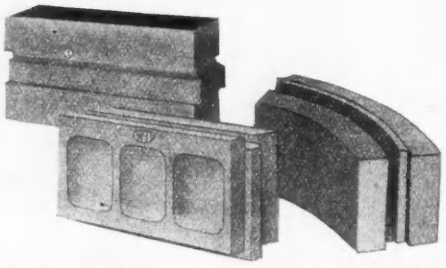
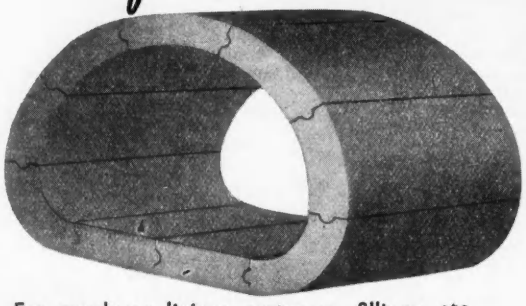
Retort sections and special shapes for horizontal and vertical installations can be relied upon to give trouble-free and economic service when made in "BLUEBELL" 95% Silica material.





For producer linings, water-gas fillings, etc., "THISTLE" (35/37% alumina) and "STEIN" (30/32% alumina) firebricks are admirably suited by reason of their excellent high-temperature properties.

We are exhibiting at the Empire Exhibition, Glasgow, May—Oct., 1938, STAND No. E55, Palace of Engineering.

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STEEL CONSTRUCTIONAL WORK

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**CONDENSERS**
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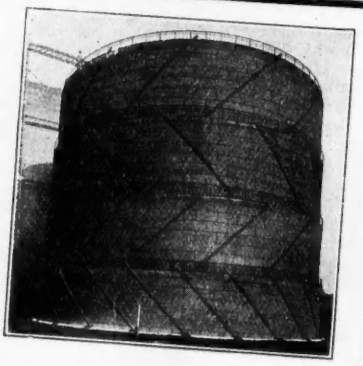
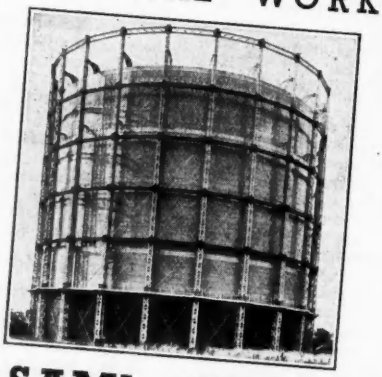
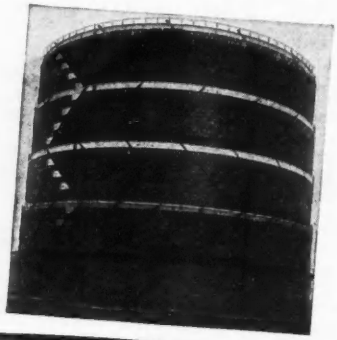
**STEEL TANKS**







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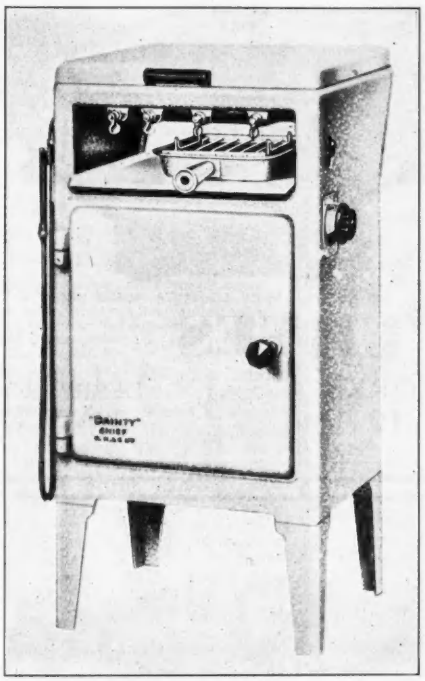
# Trade Notes

## A New Cooker by R. Russell & Sons, Ltd.

As firm believers in cast iron construction, Messrs. R. Russell & Sons, Ltd., have spent much time and expense in perfecting a cooker—named the "Dainty Chief"—which has the well-tried durability of cast iron plus the streamline appearance of modern requirements. The oven is of their usual patented single-burner bottom flue outlet design with shelf runners embossed in the inner sides.

The hotplate, measuring 18 in. by 18 in., has three or four boiling burners and reversible griller, and although the overall size is so small, there is full accommodation for four 8 in. utensils equally spaced above the burners. The thermostat and all gas piping are totally enclosed, but the former is easily removable through the cover plate without disturbing the essential piping.



The "Dainty Chief" Gas Cooker.

Although this cooker is entirely new externally, the makers have gone to great lengths to retain standard parts such as oven linings, hotplate sections, burners, &c., and this point will be greatly appreciated by undertakings in that these parts are interchangeable with those of earlier "New Herald" and "Dainty" Cookers.

## Colloidal Graphite.

We are informed that the Incandescent Heat Company, Ltd., have adopted "dag" colloidal graphite in oil for the axle bearings of their bogies and for the conveyors in the continuous types of heat treatment furnace.

## Sharples Centrifuges, Ltd.

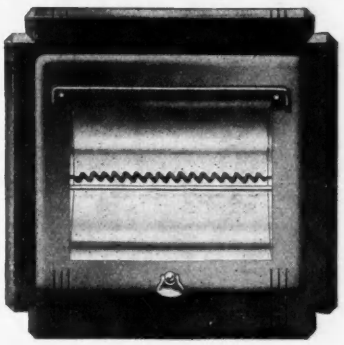
We are advised by Super-Centrifugal Engineers, Ltd., that from June 18 their name has been changed to Sharples Centrifuges, Ltd., this being for the sole purpose of identifying the Company with the name of its Founder. This Company manufacture the well-known Sharples super-centrifuge.

## William Edgar & Son, Ltd., Appointments.

Messrs. William Edgar & Son, Ltd., announce that the following members of their Staff have been appointed Assistant Directors of the Company. Most of them have been associated with the firm for many years and will be well-known to the Industry: Miss C. J. Shannon (Secretary to Company), Mr. J. Haddon (Works), Mr. C. J. White (Accountant), Mr. L. Lake (Outdoor Manager), and Mr. A. R. C. Johnston (Sales).

## A New Radiant Heater.

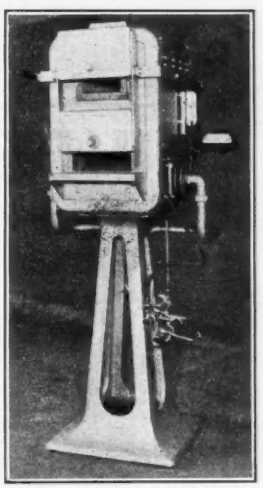
This built-in radiant gas heater—the "Wallflower"—by Cannon Iron Foundries, Ltd., has a cast-iron frame, a heating element of non-corrodible metal, and an aerated burner. It is fitted with a chromium-plated reflector, and is capable of distributing a high



proportion of radiant heat. No flue connexion is required, as the consumption per hour is only 10 cu.ft. The over-all measurements are 18 in. by 18 in., and the coloured paint finishes include Roman coin, pastel green, pastel blue, stone, brown, and oriental red.

## A New High-Speed Steel Furnace.

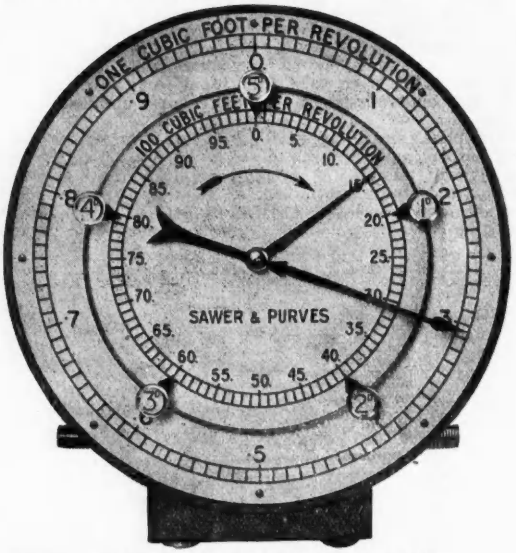
Our illustration shows a new and improved type of high-speed steel furnace designed to meet the exacting requirements of the modern tool room in the heat-treatment of carbon and high-speed steels. It is operated by a single-valve control, and will maintain a highly protective atmosphere for the tools under treatment, eliminating decarburization, blistering, pitting, grain growth, and other difficulties associated with tool hardening. The working temperatures are attained rapidly in the furnace, with economic operation. Two chambers are provided, an upper or preheating chamber maintained at a temperature of 800° C. by the waste heat from the outgoing gases, and a lower hardening chamber maintained at a temperature of 1,350° C. The combustion system is automatically controlled by an air-gas ratio proportioning valve. By introducing a controlled supply of purging gas direct into the hardening chamber, the furnace atmosphere is maintained in the correct reducing condition necessary for successful hardening. The blast burners are of special design fitted with cooling fins and refractory orifices, which are virtually indestructible. The unit is complete with a pyrometer having a temperature range up to 1,400° C., and a visible pressure gauge which enables the operator to control the atmosphere within precision limits, both these fittings being visible in the illustration. The furnace contains no fragile parts or parts subject to rapid depreciation, and the removable crown renders all external parts accessible and easy to repair.



The furnace is mounted on a cast-iron stand. The body of the furnace proper is constructed of special heat-resisting alloy cast-iron front and back plates, and a mild-steel casing. High alumina refractories are used throughout the refractory structure, which is well insulated. The doors are provided with a simple lever-operating mechanism, and are accurately counter-balanced and fitted with sight holes and refractory blocks. The refractory hearth plate, or tray, in the hardening chamber may be removed and replaced in a few minutes. Three standard sizes of furnace are available, the two smaller having a chamber depth and width of 10 in. and 6 in., and heights of 2½ in. and 5 in. respectively, while the largest has a chamber depth of 12 in., a width of 9 in., and a height of 6 in. The furnace is manufactured by the Incandescent Heat Company, Ltd., under licence from the Gas Light and Coke Company, and is arousing considerable interest at the Empire Exhibition, Glasgow, where it may be seen on the stand of the British Gas Federation.

OF SPECIAL INTEREST TO YOU!

DEMONSTRATION METER




IDEAL FOR COOKERY LECTURES, ETC.
A VALUABLE ADDITION TO THE MODERN GAS SHOWROOM.

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100 CU. FT. SMALL HIGH CAPACITY SIZE

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'Phone: Lilleshall-Shropshire Nos. 34 & 35 (2 lines)
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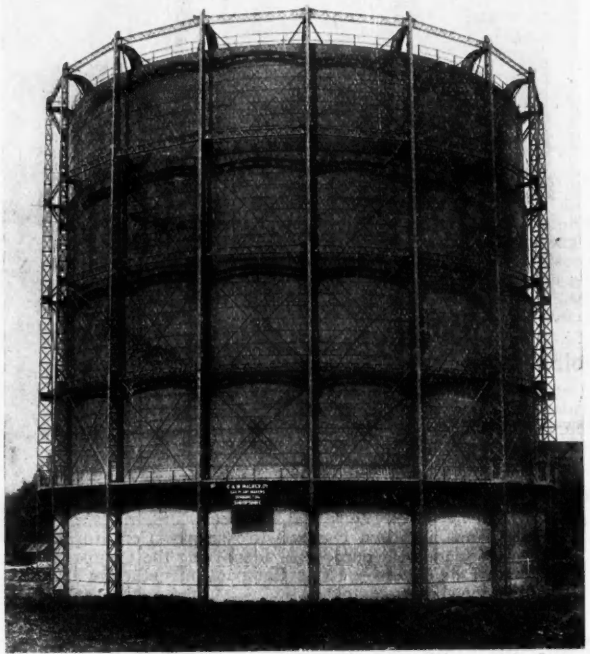

At Belper, near Derby. Capacity, 2 million cubic feet.

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# Markets and Manufactures

## Current Sales of Gas Products

### The London Market

*July* 4.

The prices of Tar Products remain on about the same level as last week—namely:

Pitch, nominal at about 33s. per ton f.o.b.

Creosote, about 5d.

Refined tar, 3¼d.

Pure toluole, 2s. 1d. to 2s. 2d.

Pure benzole, about 1s. 9d.

95/160 solvent naphtha, 1s. 7d.

90/160 pyridine, about 10s.

All per gallon naked at makers' works.

### The Provinces

*July* 4.

Crude Gas-Works Tar, 16s. to 21s.

To avoid misunderstanding, it is necessary to state that the above price is not claimed to represent a market value. It is a price worked out from week to week upon a system which has been used for many years as a basis for the fixing of certain contracts for crude tar of varying qualities in different areas.

The average prices of gas-works products during the week were: Pitch—East Coast, 31s. 6d. to 32s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 31s. 6d. to 32s. 6d.* Toluole, naked, North, 1s. 7½d. to 1s. 9d. Coal tar, crude naphtha, in bulk, North, 7¾d. to 8¼d. Solvent naphtha, naked, North, 1s. 4½d. to 1s. 5d. Heavy naphtha, North, 1s. 3d. to 1s. 3½d. Creosote, *ex* works, in bulk, North, liquid and salty, 4½d. to 4¾d.; low gravity, 4¼d. to 4½d. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid, 60's, 2s. 3d. to 2s. 6d. Naphthalene, £13 10s. to £16. Salts, 80s. to 85s., bags included. Anthracene, "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal; "B" quality unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

### Scotland

GLASGOW, *July* 2.

Market continues almost unaltered and little new business has been arranged.

Crude gas-works tar.—Actual value is 37s. to 38s. per ton *ex* works in bulk.

Pitch.—Enquiries are only for small quantities and quotations are about 25s. per ton f.o.b. for export, and 23s. per ton *ex* works in bulk for home trade.

Refined tar.—Deliveries are steady and values remain at 3¾d. to 4d. per gallon f.o.r. naked for home trade. Export continues at 3d. to 3¼d. per gallon in buyers' packages at makers' works.

Creosote oil.—Available supplies are being taken up readily at the following prices: Specification oil, 5d. to 5¼d. per gallon; low gravity, 6¼d. to 6½d. per gallon; neutral oil, 5d. to 5¼d. per gallon; all *ex* works in bulk.

Cresylic acid.—Buyers continue to show practically no interest and prices are nominal as follows: Pale, 97/99%, 1s. 8d. to 1s. 10d. per gallon; dark, 97/99%, 1s. 6d. to 1s. 8d. per gallon; and pale, 99/100%, 2s. 1d. to 2s. 4d. per gallon; all according to quality *ex* works in buyers' packages.

Crude naphtha continues at 5½d. to 6d. per gallon *ex* works in bulk, according to quality.

Solvent naphtha.—90/160 grade is 1s. 4d. to 1s. 4½d. per gallon and 90/190 heavy naphtha is 1s. 1d. to 1s. 1½d. per gallon.

Motor benzole is valued at 1s. 4d. to 1s. 4½d. per gallon.

Pyridine.—90/160 grade is 10s. 6d. to 11s. per gallon and 90/140 grade is 11s. to 12s. per gallon.

### Benzole Prices

These are considered to be the market prices for benzole at the present time:

| | s. d. | s. d. | |
|---|---|---|---|
| Crude benzole.. | 0 9½ | to 0 10 | per gall. at works |
| Motor „ .. | 1 3 | „ 1 3½ | „ „ „ |
| 90% „ .. | 1 4 | „ 1 4½ | „ „ „ |
| Pure „ .. | 1 8 | „ 1 8½ | „ „ „ |

## Contracts Advertised To-Day

**Coal.**

Ellesmere Port Gas Department. [p. 66.]

Haverhill (Suffolk) Gas Department. [p. 66.]

Newton-in-Makerfield Gas Department. [p. 66.]

## Overseas Opportunities

### Café Equipment

A well-established firm of agents in South Brisbane wishes to obtain the representation of United Kingdom manufacturers of fittings and equipment for cafés. (*Board of Trade Journal;* Ref. No. 454.)

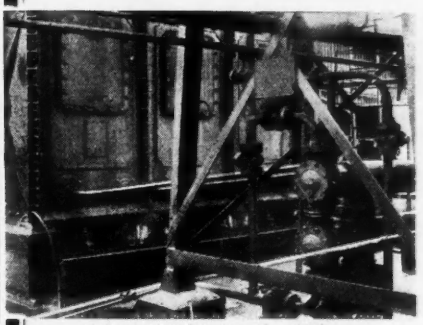
## Heywood Gas Department

The Borough of Heywood Gas Department plan to replace their present carbonizing plant, which has been in operation since 1913, with a complete installation of Glover-West latest type continuous vertical retorts, complete with coal handling plant. During the twelve months ended on March 31 last the total sales of gas amounted to 609,437 therms, a decrease of 5·76% on the sales of the previous year. Ordinary consumers took 124,638 therms, consumers on the two-part charge took 22,252 therms, and prepayment meter users 277,278 therms. Gas engines, industrial, and special purposes were responsible for 145,821 therms, or 23% of the total consumption. In spite of competition and general trade depression in the town, the sales of modern gas appliances constitute a record in the history of the undertaking.

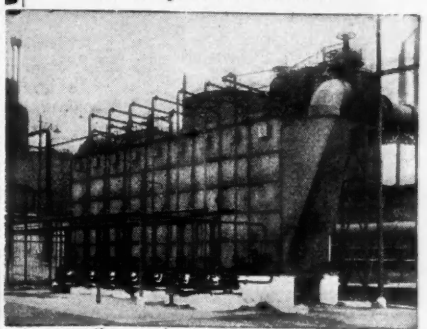

There's only one

Permac!

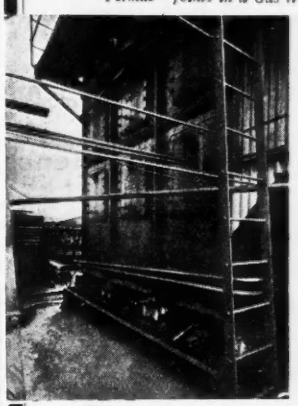
METAL-TO-METAL JOINTING MATERIAL.



"Permac" Joints in a Gas Works.



"Permac" Joints in a Gas Works.



"Permac" Joints in a Gas Works.

Be sure you get it!

Here is a selection of "Permac" joints photographed in various Gas Works. "Permac," the Metal-to-Metal Jointing, has been holding up difficult joints like these for over 25 years. Send for particulars.

*Sole Manufacturers:*

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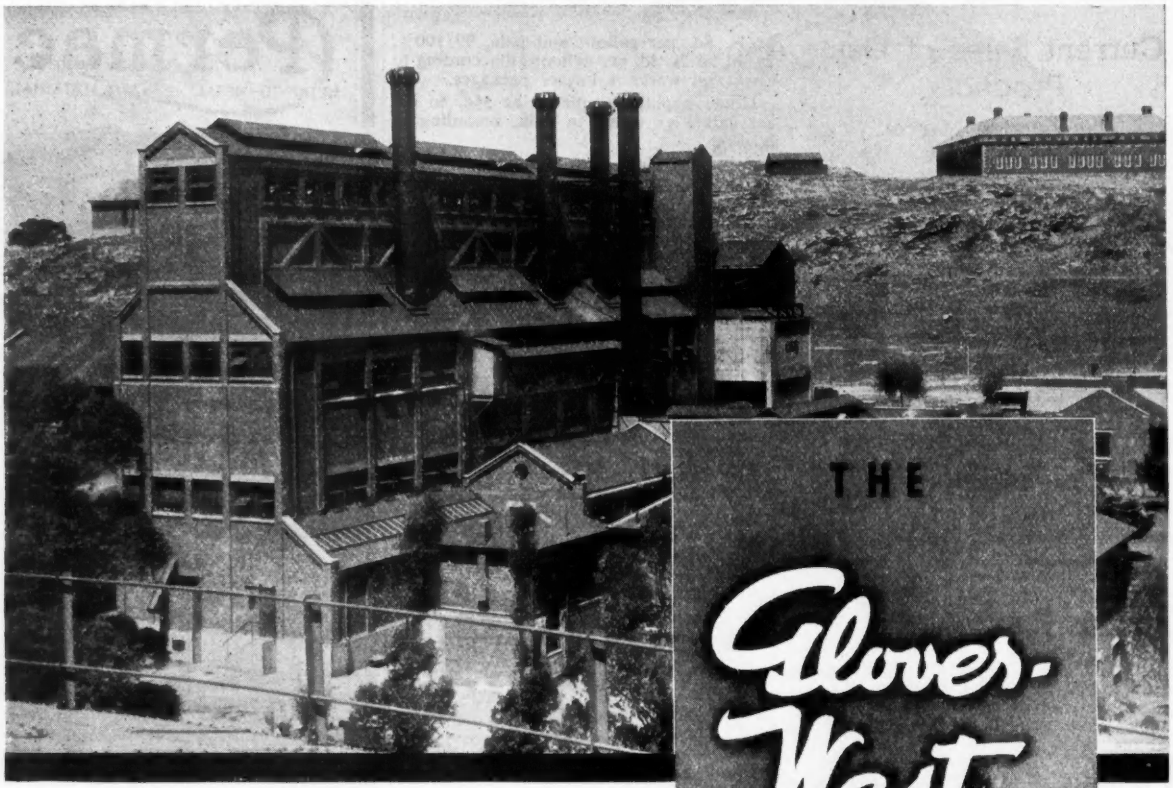
# ● CARBONIZATION IN VERTICAL RETORTS




**The modern Glover-West vertical retort plant has behind it the accumulated experience of 64 years constant research and development for the advancement of gas production methods the world over.**

● *423 plants have been built or are on order for 223 Gas Undertakings in 24 countries.*

The picture shows the three installations of Glover-West vertical retorts at Johannesburg City Council's Cottesloe gas works. The carbonising unit of the complete modern gasworks ordered for Johannesburg from this company in 1926 has been trebled to meet the rapid growth of demand. The latest extension put to work in 1937 is nearest the camera.

●

**WEST'S GAS IMPROVEMENT CO. LTD.,**

**MANCHESTER: Albion Ironworks, Miles Platting ■ LONDON: Columbia House, Aldwych, W.C.2**

# GAS STOCKS AND SHARES

The continued activity on Wall Street further stimulated conditions on the Stock Exchange last week and prices again hardened in most sections. Despite the heavy turnover in the more speculative groups, gilt-edged stocks were active and quotations closed fractionally higher. The only weak spot was the home-rail market which reacted sharply on the poor traffic returns. Industrial shares continued in good demand with values again on the up-grade. A rise in the price of the commodity to 7¼d. per lb. gave a fillip to rubber shares, while oils remained steady. Activity was noticeable in the mining market and a number of issues made substantial improvement. Prospects for the coming autumn appear much brighter than they did a few weeks ago.

The Gas market opened quietly, though the volume of business increased as the week progressed. Price changes were confined solely to the Official List and with one exception were upwards. Gas Light units followed up the previous week's gain with a further rise of 9d. to 24s. Imperial Continental turned the corner again, closing 2 points higher at 119½; Watford also strengthened 2, and it will be seen in the list that several stocks improved a point.

Markets generally have been through some very trying times during the past year, and although the position at home has remained comparatively strong the many complex financial and political events abroad have had serious repercussions on the values of securities. With few exceptions, however, the prices of gas stocks and shares have not depreciated seriously during this period, and the following table containing a comparison of some of the leading "ordinaries" illustrates the position:

| —— | 1937. July 2. | 1938. July 1. | Fall on Year. |
|---|---|---|---|
| Alliance and Dublin .. .. | 170—175 | 145—155 | 22½ |
| Bournemouth 7% .. .. .. | 161—166 | 157—162 | 4 |
| Brighton 5% .. .. .. | 138—143 | 128—133 | 10 |
| Bristol .. .. .. .. | 116—117 | 113—115 | 2½ |
| Cardiff .. .. .. .. | 120—125 | 120—125 | — |
| Commercial .. .. .. | 88—93 | 81—86 | 7 |
| Croydon Sliding Scale .. .. | 143—148 | 137—142 | 6 |
| Gas Light Units .. .. .. | 24/9—25/9 | 23/6—24/6 | 1/3 |
| Imperial Continental .. .. | 146—151 | 117—122 | 29 |
| Portsmouth .. .. .. | 167—172 | 160—165 | 7 |
| Newcastle Units .. .. .. | 25/3—25/9 | 22/9—23/3 | 2/6 |
| Sheffield .. .. .. .. | 144—146 | 140—143 | 3½ |
| South-Eastern Gas £1 .. .. | 24/—26/– | 22/—24/– | 2/– |
| South Metropolitan .. .. | 107—110 | 105—108 | 2 |
| South Suburban .. .. .. | 122—127 | 118—123 | 4 |
| Southampton .. .. .. | 111—116 | 108—113 | 3 |
| Tottenham .. .. .. .. | 137—142 | 126—131 | 11 |
| Wandsworth .. .. .. | 143—148 | 137—142 | 6 |
| Watford .. .. .. .. | 142—147 | 137—142 | 5 |

# Official Quotations on the London Stock Exchange

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations July 1. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 1,767,439 | Mar. 7 | 8 | 8 | Alliance & Dublin Ord. ... | 145—155 | ... |
| 374,000 | June 20 | 4 | 4 | Do. 4 p.c. Deb. ... | 93—108* | ... |
| 734,733 | May 9 | 5 | 5 | Asscd. Gas & Water U'd'ts Ord. | 17/6—19/6 | ... |
| 500,000 | ,, | 4½ | 4½ | Do. 4½ p.c. Red. Cum. Pref. | 19/—21/– | ... |
| 444,389 | ,, | §–/4 | 4 | Do. 4 p.c. Red. Cum. Pref. | 19/—20/– | ... |
| 296,523 | ,, | 4 | 4 | Do. 4 p.c. Irred. Cum. Pref. | 17/—19/– | ... |
| 500,000 | Mar. 7 | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 94—99 | ... |
| 558,890 | Feb. 21 | 7 | 7 | Barnet Ord. 7 p.c. ... ... | 158—163 | ... |
| 300,000 | Apl. 4 | 1/4½ | 1/9½ | Bombay, Ltd. ... ... ... | 24/6—26/6 | ... |
| 179,915 | Feb. 21 | 9½ | 9½ | Bournemouth sliding scale ... | 195—205 | ... |
| 590,407 | ,, | 7 | 7 | Do. 7 p.c. max. ... | 157—162 | ... |
| 493,960 | ,, | 6 | 6 | Do. 6 p.c. Pref. ... | 133—138 | +1 |
| 50,000 | June 20 | 3 | 3 | Do. 3 p.c. Deb. ... | 77—82* | ... |
| 262,025 | ,, | 4 | 4 | Do. 4 p.c. Deb. ... | 97—102* | ... |
| 335,000 | ,, | 5 | 5 | Do. 5 p.c. Deb. ... | 115—120* | ... |
| 357,900 | Feb. 21 | 7½ | 7½ | Brighton, &c., 6 p.c. Con. ... | 145—150 | ... |
| 649,955 | ,, | 6½ | 6½ | Do. 5 p.c. Con. ... | 128—133 | ... |
| 205,500 | ,, | 6 | 6 | Do. 6 p.c. 'B' Pref. | 125—130 | ... |
| 855,000 | Mar. 7 | 7 | 8 | British Ord. ... ... ... | 138—143 | ... |
| 100,000 | June 3 | 7 | 7 | Do. 7 p.c. Pref. ... ... | 140—145 | ... |
| 350,000 | ,, | 5½ | 5½ | Do. 5½ p.c. 'B' Cum. Pref. | 110—115 | ... |
| 120,000 | ,, | 4 | 4 | Do. 4 p.c. Red. Deb. ... | 94—99 | ... |
| 450,000 | ,, | 5 | 5 | Do. 5 p.c. Red. Deb. ... | 102—107 | ... |
| 450,000 | ,, | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 94—99 | ... |
| 100,000 | 22 May'33 | 6 | 4 | Cape Town, Ltd. ... ... | 1⅛—2⅛ | ... |
| 100,000 | 6 Nov.'33 | 4½ | 4½ | Do. 4½ p.c. Pref. ... | 1⅛—3⅛ | ... |
| 150,000 | June 20 | 4½ | 4½ | Do. 4½ p.c. Deb. ... | 60—70* | ... |
| 626,860 | Feb. 7 | 6 | 6 | Cardiff Con. Ord. ... ... | 120—125 | ... |
| 237,860 | June 3 | 5 | 5 | Do. 5 p.c. Red. Deb. | 105—110 | ... |
| 98,936 | Mar. 21 | 2/– | 2/– | Colombo Ord.... ... ... | 1⅛—1⅞ | ... |
| 24,510 | ,, | 1/4½ | 1/4½ | Do. 7 p.c. Pref.... ... | 23/—25/– | ... |
| 739,453 | Mar. 21 | –/11·48 | –/11·48 | Colonial Gas Assn. Ltd. Ord. | 16/6—18/6 | ... |
| 296,144 | ,, | 1/3·30 | 1/3·30 | Do. 8 p.c. Pref. ... | 23/—25/– | ... |
| 1,775,005 | Feb. 7 | 5 | 5 | Commercial Ord. ... ... | 81—86 | ... |
| 620,000 | June 3 | 3 | 3 | Do. 3 p.c. Deb. ... | 72—77 | ... |
| 286,344 | Feb. 7 | 5 | 5 | Do. 5 p.c. Deb. ... | 114—119 | ... |
| 807,560 | Feb. 21 | 7 | 7 | Croydon sliding scale ... | 137—142 | ... |
| 644,590 | ,, | 5 | 5 | Do. max. div. ... | 107—112 | ... |
| 620,385 | June 20 | 5 | 5 | Do. 5 p.c. Deb. ... | 113—118* | ... |
| 239,000 | Feb. 7 | 5 | 5 | East Hull Ord. 5 p.c. ... ... | 96—101 | ... |
| 185,355 | Feb. 21 | 6 | 6 | East Surrey Ord. 5 p.c. ... | 118—123 | ... |
| 176,211 | June 3 | 5 | 5 | Do. 5 p.c. Deb. ... | 115—120 | ... |
| 250,000 | Nov. 15 | 7 | 4 | Gas Consolidation Ord. 'B' ... | 19/—21/– | ... |
| 250,000 | May 9 | 4 | 4 | Do. 4 p.c. Red. Cum. Pref. | 17/6—19/6 | ... |
| 19,223,324 | Feb. 7 | 5‡ | 5‡ | Gas Light & Coke Ord. ... | 23/6—24/6a | +–/9 |
| 2,600,000 | ,, | 3½ | 3½ | Do. 3½ p.c. max. ... | 77—80 | ... |
| 4,477,106 | ,, | 4 | 4 | Do. 4 p.c. Con. Pref. ... | 100—103 | ... |
| 2,993,000 | Jan. 17 | — | 3½ | Do. 3½ p.c. Red. Pref. ... | 100—103 | ... |
| 8,602,497 | May 23 | 3 | 3 | Do. 3 p.c. Con. Deb. ... | 79—82 | +1 |
| 3,642,770 | ,, | 5 | 5 | Do. 5 p.c. Red. Deb. ... | 111—114 | +1 |
| 3,500,000 | ,, | 4½ | 4½ | Do. 4½ p.c. Red. Deb. ... | 109—112 | ... |
| 700,000 | Mar. 7 | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 97—100 | ... |
| 270,466 | Feb. 21 | 6 | 6 | Harrogate New Cons. ... | 118—123 | ... |
| 157,500 | Mar. 21 | 1/2½ | 1/–‡ | Hong Kong and China Ord. ... | ⅜—1 | ... |
| 213,200 | Feb. 7 | 6 | 6 | Hornsey Con. 3½ p.c. ... | 100—110 | ... |
| 5,600,000 | May 9 | 8 | 12 | Imperial Continental Cap ... | 117—122 | +2 |
| 223,130 | Jan. 17 | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 88—93 | ... |
| 285,242 | Feb. 21 | 8½ | 8½ | Lea Bridge 5 p.c. Ord. ... | 167—172 | ... |
| 11,751 | Feb. 21 | 8 | 10 | Maidstone 5 p.c. Cap. ... | 175—185 | ... |
| 63,480 | June 20 | 3 | 3 | Do. 3 p.c. Deb.... | 70—75* | ... |
| 75,000 | May 23 | †10 | †10 | Malta & Mediterranean Metropolitan (of Melbourne) | 137—142 | ... |
| 392,000 | Apl. 1 | 5½ | 5½ | 5½ p.c. Red. Deb. ... ... | 99—102 | ... |
| 231,977 | Feb. 21 | 5 | 5 | M.S. Utility 'C' Cons. ... | 99—104 | ... |
| 968,658 | ,, | 4 | 4 | Do. 4 p.c. Cons. Pref. | 95—100 | ... |
| 360,075 | June 20 | 4 | 4 | M.S. Utility 4 p.c. Deb. ... | 95—100* | ... |
| 148,955 | ,, | 5 | 5 | Do. 5 p.c. Deb. ... | 113—118* | ... |
| 675,000 | May 9 | †6 | †6 | Montevideo, Ltd. ... ... | 70—75 | ... |
| 250,000 | Mar. 7 | 7½ | 7½ | North Middlesex 6 p.c. Con. | 145—150 | ... |
| 396,160 | Feb. 7 | 5 | 5 | Northampton 5 p.c. max. ... | 107—112 | ... |
| 300,000 | Apl. 25 | †9 | †7 | Oriental, Ltd. ... ... ... | 149—154 | –1 |
| 468,537 | June 3 | 8 | 8 | Plymouth & Stonehouse 5 p.c. | 153—158 | +1 |
| 621,667 | Feb. 7 | 8½ | 8½ | Portsmouth & Gosport Cons. | 160—165 | ... |
| 241,446 | ,, | 5 | 5 | Do. 5 p.c. max. ... | 102—107 | ... |
| 73,350 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... | 108—113 | ... |
| 75,000 | ,, | — | 4 | Do. 4 p.c. Pref. ... | 95—100 | ... |
| 114,000 | Feb. 7 | 5 | 5 | Preston 5 p.c. Pref. ... ... | 106—109 | ... |
| 247,966 | June 3 | 4 | 4 | Primitiva 4 p.c. Cons. Deb. ... | 97—102 | ... |
| 625,959 | Jan. 17 | 4 | 4 | Do. 4 p.c. Red. Deb. ... | 95—100 | ... |
| 15,000 | Mar. 21 | 6 | 6 | San Paulo 6 p.c. Cum. Pref. ... | 8⅞—9½ | ... |
| 441,275 | Apl. 25 | 1/1½ | 1/1½ | Severn Val. Gas Cor. Ld. Ord. | 20/6—22/6 | ... |
| 460,810 | Mar. 21 | –/10⅝ | –/10⅝ | ,, ,, 4½ p.c. Cum. Pref. | 19/6—21/6 | ... |
| 133,201 | Feb. 7 | 8½ | 5 | Shrewsbury 5 p.c. Ord. ... | 128—133 | ... |
| 9,000 | June 3 | 4 | ‡4 | South African Ord. ... ... | 3⅞—4⅞ | ... |
| 1,371,752 | Apl. 25 | 1/2⅜ | 1/2⅜ | South East'n Gas Cn. Ld. Ord. | 22/—24/– | •.. |
| 871,636 | Mar. 7 | –/10⅝ | –/10⅝ | Do. 4½ p.c. Red. Cum. Pref. | 20/6—22/6 | ... |
| 498,818 | ,, | 4 | 4 | Do. 4 p.c. Cum. Pref. ... | 18/—20/– | ... |
| 450,000 | Feb. 7 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 100—103 | ... |
| 150,000 | ,, | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 95—98 | ... |
| 6,709,895 | Feb. 7 | 6 | 5 | South Met. Ord. ... ... | 105—108 | +1 |
| 1,135,812 | ,, | 6 | 6 | Do. 6 p.c. Irred. Pref. ... | 130—135 | ... |
| 850,000 | ,, | 4 | 4 | Do. 4 p.c. Irred. Pref. ... | 97—100 | ... |
| 1,895,445 | June 20 | 3 | 3 | Do. 3 p.c. Deb. ... ... | 77½—80½ | ... |
| 1,000,000 | Jan. 17 | 5 | 5 | Do. 5 p.c. Red. Deb. ... | 109—112 | ... |
| 600,000 | — | — | — | Do. 3½ p.c. Red. Deb. ... | 99—102 | ... |
| 1,543,795 | Feb. 7 | 6 | 6 | South Suburban Ord. 5 p.c. ... | 118—123 | ... |
| 512,825 | ,, | 5 | 5 | Do. 5 p.c. Pref.... ... | 110—115 | ... |
| 500,000 | ,, | 4 | 4 | Do. 4 p.c. Pref.... ... | 95—100 | ... |
| 250,000 | ,, | §18/9 | 3½ | Do. 3½ p.c. Red. Pref. ... | 98—101 | ... |
| 888,587 | June 3 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 115—120 | ... |
| 250,000 | ,, | 4 | 4 | Do. 4 p.c. Deb.... ... | 96—101 | ... |
| 200,000 | Mar. 1 | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 94—99 | ... |
| 427,859 | Apl. 25 | 1/2½ | 9½ | S. Western Gas & Water Ord. | 16/6—18/6 | ... |
| 160,523 | ,, | –/10⅛ | –/10⅛ | Do. 4½ p.c. Red. Cum. Pf. | 19/—21/– | ... |
| 110,000 | June 3 | 4 | 4 | Do. 4 p.c. Red. Deb. ... | 95—100 | ... |
| 750,541 | Feb. 7 | 5 | 5½ | Southampton Ord. 5 p.c. ... | 108—113 | ... |
| 148,836 | June 3 | 4 | 4 | Do. 4 p.c. Deb. | 95—100 | ... |
| 350,000 | Feb. 7 | 5½ | 5½ | Swansea 5½ p.c. Red. Pref. ... | 108—113 | ... |
| 94,000 | June 3 | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 95—100 | ... |
| 1,076,490 | Feb. 7 | 6½ | 6½ | Tottenham and District Ord. | 126—131 | ... |
| 409,835 | ,, | 5½ | 5½ | Do. 5½ p.c. Pref. ... | 119—124 | ... |
| 62,235 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... | 108—113 | ... |
| 371,850 | June 3 | 4 | 4 | Do. 4 p.c. Deb. ... | 95—100 | ... |
| 85,701 | Apl. 25 | 6 | 6 | Tuscan 6 p.c. Red. Deb. ... | 95—100 | ... |
| 888,629 | Apl. 4 | 4 | 6 | U. Kingdom Gas Cor. Ord. ... | 18/6—20/6 | ... |
| 937,743 | May 9 | 4½ | 4½ | Do. 4½ p.c. 1st Cum. Pref. | 19/6—21/6 | ... |
| 500,000 | ,, | –/1·15 | 4 | Do. 4 p.c. 1st Red. Cum. Pf. | 19/—21/– | ... |
| 745,263 | June 3 | 4½ | 4½ | Do. 4½ p.c. 2nd Non-Cum.Pf. | 16/—18/– | ... |
| 1,000,000 | Mar. 7 | 3½ | 3½ | Do. 3½ p.c. Red. Deb. ... | 96—99 | ... |
| 373,939 | Feb. 7 | 7 | 7 | Uxbridge, &c., 5 p.c. ... ... | 133—138 | ... |
| 133,010 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... | 108—113 | ... |
| 1,371,138 | Feb. 7 | 7 | 7 | Wandsworth Consolidated ... | 137—142 | ... |
| 2,525,768 | ,, | 4 | 4 | Do. 4 p.c. Pref. ... | 98—101 | ... |
| 1,343,964 | June 3 | 5 | 5 | Do. 5 p.c. Deb. ... | 115—120 | ... |
| 383,745 | ,, | 4 | 4 | Do. 4 p.c. Deb. ... | 97—102 | ... |
| 558,342 | Feb. 7 | 7 | 7 | Watford and St. Albans Ord. | 137—142 | +2 |
| 200,000 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... | 110—115 | ... |
| 200,000 | ,, | 5½ | 5½ | Do. 5½ p.c. Pref. ... | 120—125 | ... |
| 200,000 | June 3 | 4 | 4 | Do. 4 p.c. Red. Deb. | 96—101 | ... |
| 100,000 | ,, | 3½ | 3½ | Do. 3½ p.c. Red. Deb. | 94—99* | ... |

a.—The quotation is per £1 of stock. * Ex. div. † Paid free of income-tax. ‡ For year. § Actual.

**Supplementary List and Provincial Exchanges overleaf.**

# STOCK AND SHARE LIST—Cont.

## Supplementary List, not Officially Quoted, London

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Nominal Quotations July 1. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 202,152 | Mar. 21 | 5 | 5 | Ascot Ord. ... ... ... | 103—108 | ... |
| 128,182 | Dec. 13 | 5 | 5 | Do. 5 p.c. Pref. ... ... | 108—113 | ... |
| 31,035 | Mar. 21 | ... | –/4⅝ | Associated Utilities 4 p.c. Pref. | 16/—18/– | ... |
| 100,000 | Dec. 13 | ... | 3½ | Do. 3½ p.c. Red. Deb. ... | 95—100 | ... |
| 17,000 | Feb. 21 | 8 | 8 | Bognor Orig. Ord. 'A' ... | 155—165 | ... |
| 62,210 | ,, | 8 | 8 | Do. New Addl. 'A' ... | 155—165 | ... |
| 87,160 | ,, | 7 | 7 | Do. New 7 p.c. max. ... | 155—165 | ... |
| 37,440 | Feb. 7 | 10 | 10 | Cam. Univ. & Town 10 p.c. max. | 190—200 | ... |
| 125,970 | ,, | 7 | 7 | Do. 7 p.c. max. ... ... | 135—140 | ... |
| 39,025 | ,, | 5 | 5 | Do. 5 p.c. max. ... ... | 97—102 | ... |
| 96,410 | Feb. 7 | 4½ | 4½ | Cardiff 4½ p.c. Pref. ... ... | 95—100 | ... |
| 150,000 | Feb. 21 | 4 | 4 | Croydon 4 p.c. Pref. ... ... | 98—101 | ... |
| 130,000 | June 20 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 97—102* | ... |
| 65,000 | Mar. 7 | 7½ | 8½ | Eastbourne 'A' 5 p.c. ... | 155—160 | ... |
| 198,000 | ,, | 6 | 7 | Do. 'B' 3½ p.c. ... ... | 125—130 | ... |
| 112,312 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 107—112 | ... |
| 130,000 | June 20 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 110—115* | ... |
| 24,000 | Feb. 21 | 8½ | 8½ | Great Yarmouth 8½ p.c. max. | 43—48 | ... |
| 59,400 | ,, | 7½ | 7½ | Do. 7½ p.c. max. ... ... | 33—38 | ... |
| 51,160 | June 3 | 5½ | 5½ | Do. 5½ p.c. Deb. ... ... | 120—125 | ... |
| 152,600 | Feb. 21 | 8 | 9 | Guildford Cons. ... ... | 167—172 | ... |
| 54,055 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 108—113 | ... |
| 68,250 | June 20 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 107—112 | ... |
| 156,600 | Feb. 21 | 7½ | 7½ | Hampton Court Cons. ... | 140—150 | ... |
| 80,000 | Feb. 21 | 4 | 4 | Lea Bridge 4 p.c. Pref. ... | 94—99 | ... |
| 60,000 | ,, | 6 | 6 | Do. 6 p.c. Pref. ... ... | 123—128 | ... |
| 94,876 | June 3 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 95—100 | ... |
| 73,620 | Mar. 7 | 8½ | 8½ | Luton Cons. 'A' ... ... | 160—165 | ... |
| 107,960 | Mar. 21 | 4 | 5½ | Mid Kent Ord. ... ... | 8¾—9¾ | ... |
| 230,940 | Feb. 7 | 10 | 10 | Oxford & District Ord. ... | 198—203 | ... |
| 47,112 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 106—111 | ... |
| 50,000 | ,, | 6 | 6 | Do. 6 p.c. Red. Pref. ... | 108—113 | ... |
| 126,193 | May 9 | 7½ | 7½ | Peterborough Ord. ... ... | 135—145 | ... |
| 64,990 | Mar. 7 | 6½ | 7½ | Redditch Ord.... ... ... | 120—130 | ... |
| 166,850 | Feb. 7 | 8 | 8 | Romford Ord.... ... ... | 144—149 | ... |
| 60,000 | ,, | 4 | 4 | Do. 4 p.c. Pref. ... ... | 97—100 | ... |
| 44,000 | Mar. 21 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 111—116 | ... |
| 25,570 | Feb. 7 | 5½ | 5½ | Rugby 5½ p.c. Pref. ... ... | 123—128 | ... |
| 25,000 | ,, | 6 | 6 | Do. 6 p.c. Red. Pref. ... | 105—110 | ... |
| 42,750 | June 3 | 5½ | 5½ | Do. 5½ p.c. Deb. ... ... | 118—123 | ... |
| 110,950 | Feb. 21 | 8 | 8 | Ryde Ord. ... ... ... | 140—150 | ... |
| 270,086 | Mar. 21 | 7 | 7 | Slough Ord. ... ... ... | 128—133 | ... |
| 21,000 | June 20 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 110—115* | ... |
| 28,872 | May 9 | 5½ | 5½ | S. Midland Gas Cpn. Ltd. Ord. | 19/—21/– | ... |
| 28,866 | Mar. 7 | 4½ | 4½ | Do. 4½ p.c. Red. Cum. Pref. | 18/6—20/6 | ... |
| 137,730 | Feb. 21 | 7 | 7 | Southgate & Dist. 7 p.c. max. | 140—145 | ... |
| 62,500 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 110—115 | ... |
| 117,228 | Feb. 7 | 5 | 7 | Swindon Cons. ... ... | 104—109 | ... |
| 60,425 | June 3 | 5 | 5 | Do. 5 p.c. Deb. ... ... | 110—115 | ... |
| 64,380 | June 3 | 5 | 5 | Torquay & Paignton 5 p.c. Pref. | 107—112 | ... |
| 33,858 | May 9 | –/2·70*b* | 4½ | United Kingdom Gas Corpn. 4½ p.c. 1st Cum. Pref. ... | 18/—20/– | ... |
| 130,000 | Feb. 7 | 5 | 8 | Wakefield Ord. ... ... | 118—123 | ... |
| 81,650 | ,, | 5 | 5 | Do. 5 p.c. max. ... ... | 101—106 | ... |
| 82,000 | Feb. 21 | 6 | 6 | Weymouth Ord. ... ... | 105—110 | ... |
| 98,384 | Feb. 7 | 6 | 6 | Wolverhampton 6 p.c. Pref. | 118—123 | ... |
| 160,000 | June 20 | 5½ | 5½ | Do. 5½ p.c. Rd. Db. | 105—110* | ... |
| 90,000 | June 20 | 5 | 5 | York 5 p.c. Red. Deb. ... | 104—109* | ... |
| 133,640 | Feb. 21 | 6½ | 6½ | Yorktown (Cam.) 5 p.c. Cons. | 120—125 | ... |
| 120,000 | ,, | 5 | 5 | Do. 5 p.c. Pref. ... ... | 106—111 | ... |
| 35,000 | June 3 | 5½ | 5½ | Do. 5½ p.c. Deb. ... ... | 120—125 | ... |

## BRISTOL EXCHANGE

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations July 1. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 347,756 | Feb. 7 | 5 | 6 | Bath Cons. ... ... ... | 120—122 | ... |
| 1,667,250 | Feb. 7 | 5 | 5 | Bristol, 5 p.c. max. ... ... | 113—115 | ... |
| 120,420 | June 3 | 4 | 4 | Do. 1st 4 p.c. Deb. ... | 98—101 | ... |
| 217,870 | ,, | 4 | 4 | Do. 2nd 4 p.c. Deb. ... | 98—101 | ... |
| 328,790 | ,, | 5 | 5 | Do. 5 p.c. Deb. ... ... | 119—122 | ... |
| 274,000 | Feb. 21 | 5 | 5 | Newport (Mon). 5 p.c. max.... | 99—101 | ... |
| 13,200 | Mar. 21 | 7 | 8⅝ | Pontyp'l Gas & W. 10 p.c. 'A' | 13—14 | ... |
| 13,600 | ,, | 5 | 6 | Do. 7 p.c. 'B' | 12—12½ | ... |
| 40,000 | ,, | 5 | 6 | Do. 7 p.c. 'C' | 12—12½ | ... |
| 140,778 | Feb. 7 | 5 | 5 | Weston-super-Mare Cons. ... | 110—112 | ... |
| 64,338 | June 20 | 4 | 4 | Do. 4 p.c. Deb. | 93—95* | ... |
| 33,340 | ,, | 7½ | 7½ | Do. 7½ p.c. Deb. | 151—154* | ... |

## LIVERPOOL EXCHANGE

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations July 1. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 157,150 | Feb. 7 | 5 | 6½ | Chester 5 p.c. Ord. ... ... | 107—110 | ... |
| 92,500 | June 20 | 4 | 4 | Do. 4 p.c. Pref. ... ... | 95—99* | ... |
| 36,430 | ,, | 3½ | 3½ | Do. 3½ p.c. Deb. ... ... | 87—90* | ... |
| 41,890 | ,, | 4 | 4 | Do. 4 p.c. Red. Deb. ... | 97—101* | ... |
| 2,167,410 | Feb. 21 | 6 | 6 | Liverpool 5 p.c. Ord.... ... | 124¾—125½ | ... |
| 245,500 | June 20 | 5 | 5 | Do. 5 p.c. Red. Pref. ... | 97—102* | ... |
| 306,083 | Jan. 17 | 4 | 4 | Do. 4 p.c. Deb.... ... | 100—102 | ... |
| 106,280 | Feb. 7 | 10 | 10 | Preston 'A' 10 p.c. ... ... | 202—212 | ... |
| 188,219 | ,, | 7 | 7 | Do. 'B' 7 p.c. ... ... | 144—154 | ... |

## NEWCASTLE EXCHANGE

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations July 1. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 122,577 | Feb. 21 | 8 | 8 | Blyth 5 p.c. Ord. ... ... | 163½—164½ | ... |
| 732,000 | Feb. 21 | 5 | 5 | Hartlepool G. & W. Cn. & New | 110—112 | ... |
| 2,061,315 | Feb. 7 | 5 | 5¾ | Newcastle & Gateshead Con. | 22/9—23/3*a* | ... |
| 682,856 | ,, | 4 | 4 | Do. 4 p.c. Pref. ... | 99½—100½ | ... |
| 776,706 | June 20 | 3½ | 3½ | Do. 3½ p.c. Deb. ... | 88½—89½* | ... |
| 277,285 | May 9 | 5 | 5 | Do. 5 p.c. Deb. '43 ... | 103—105 | ... |
| 332,351 | Feb. 7 | 6 | 6 | Sunderland 6 p.c. max. ... | 137—139 | ... |

## NOTTINGHAM EXCHANGE

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations July 1. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 542,270 | Feb. 21 | 6 | 9 | Derby Con. ... ... ... | 135—140 | ... |
| 55,000 | June 3 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 100—105 | ... |
| 20,000 | June 20 | 5 | 5 | Long Eaton 5 p.c. Pref. ... | 10—12* | ... |
| 80,000 | ,, | 5 | 5 | Do. 5 p.c. Deb. ... | 105—110* | ... |

## SHEFFIELD EXCHANGE

| Issue. £ | When ex-Dividend. | Dividends. Prev. Hf. Yr. % p.a. | Dividends. Last Hf. Yr. % p.a. | NAME. | Quotations July 1. | Rise or Fall on Week. |
|---|---|---|---|---|---|---|
| 10,000 | Feb. 21 | 10 | 10 | Great Grimsby 'A' Ord. ... | 205—215 | ... |
| 6,500 | ,, | 10 | 10 | Do. 'B' Ord. ... | 205—215 | ... |
| 79,000 | ,, | 10 | 10 | Do. 'C' Ord. ... | 195—205 | ... |
| 1,806,339 | Feb. 21 | 6½ | 6½ | Sheffield Cons. ... ... | 140—143 | ... |
| 95,000 | Jan. 3 | 4 | 4 | Do. 4 p.c. Deb. ... ... | 102—104 | ... |

*a* The quotation is per £1 of Stock. *b* Actual. * Ex div.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